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3DArtist

66

Practical inspiration for the 3D community

BECOME A MAYA MASTER

20 tips and tricks to achieve your best creature creations yet

CREATE THE COVER

TURN TO PAGE 50 NOW

50 ZBRUSH SECRETS REVEALED

Discover techniques that will forever change your digital sculpts

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ISSUE 066

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> Working on a project of this scale can be quite a challenge, but it's also good training as it covers multiple disciplines in the design process

Benjamin Erdt on the creation of his Leviathan **Page 50**

Create this creature page 50

Artist info

Benjamin Erdt

Personal portfolio site
www.ben-erdt.de

Location Netherlands

Software used Maya, MODO, ZBrush, MARI, Photoshop

Creating an image as complex and intricate as the beast that graces this issue's cover is no mean feat. Thankfully, character creation pro Benjamin Erdt is on hand to break down the process, offering his advice for managing such a large project. We also speak to some of the world's best ZBrush professionals this month, who offer their top digital sculpting tips and tricks on p24. That's just scratching the surface of this bumper issue!

Welcome

to the magazine and 116 pages of amazing 3D

Hello and welcome to 3D Artist magazine! Creature creation requires skill and patience, but most of all, it requires imagination. The brilliant Benjamin Erdt reveals his processes starting on p50, delving behind the scenes of the simply stunning Leviathan image that graces this issue's cover.

Over on p24, some of the world's best ZBrush artists also reveal tips, tricks and workflow techniques that could change the way you use the software forever. It's not to be missed!

Chris Editor

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1. **Exclusively commissioned art**
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3. **A CD packed full of creative goodness**
4. Interviews with inspirational artists
5. **Tips for studying 3D or getting work in the industry**
6. The chance to see your art in the mag!

This issue's team of expert artists...

Benjamin Erdt

Turn to p50 to learn the processes behind this issue's cover image, created the by the skilled Benjamin Erdt

Sérgio Merêces

The authority on all things arch-vis, Sérgio explores the creation of atmospheric renders over on p58

Nicolas Delille

Whether it's ladybirds, or, in this case, tarantulas, Nicolas is an expert when it comes to realistic wildlife

Olly Nicholson

Unity's Olly takes a closer look at the tools that are quickly becoming the game industry norm

Digital-Tutors

Digital-Tutors focuses its fountain of knowledge on animation for videogames on p80

Ângelo Fernandes

Want to create arch-vis renders quicker, easier and with much less fuss? Ângelo reveals all on p86

Aldo Vicente

Aldo discusses how to set up a linear workflow on p88, helping you to get the most out of your Maya renders

Michael Levine

Character effects and simulation wizard Michael casts his eye over nCloth this issue, starting on p90

Sari Rodrig

Arnold's growing popularity seems to know no bounds. Sari looks at shader techniques on p92

Orestis Bastounis

Want to upgrade your workstation but don't know what to pick? Orestis lends a helping hand on p96

David Wortley

David of the highly-respected Taylor James takes a look at the latest update to V-Ray over on p100

Ellen Wolff

The latest addition to our arsenal of tech-savvy writers, Ellen explores 'Mr. Hublot' on p106

Sign up, share your art and chat to other artists at www.3dartistonline.com

3DArtist

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INSIDE ISSUE SIXTY-SIX

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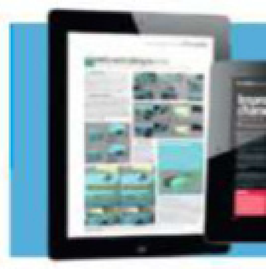

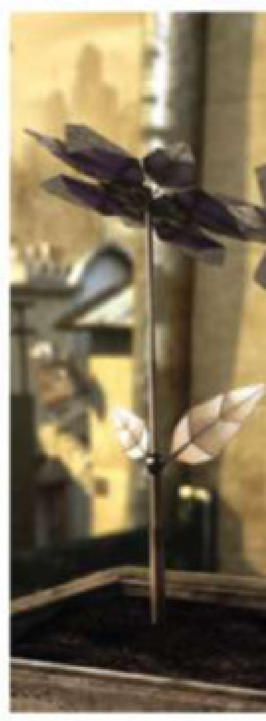

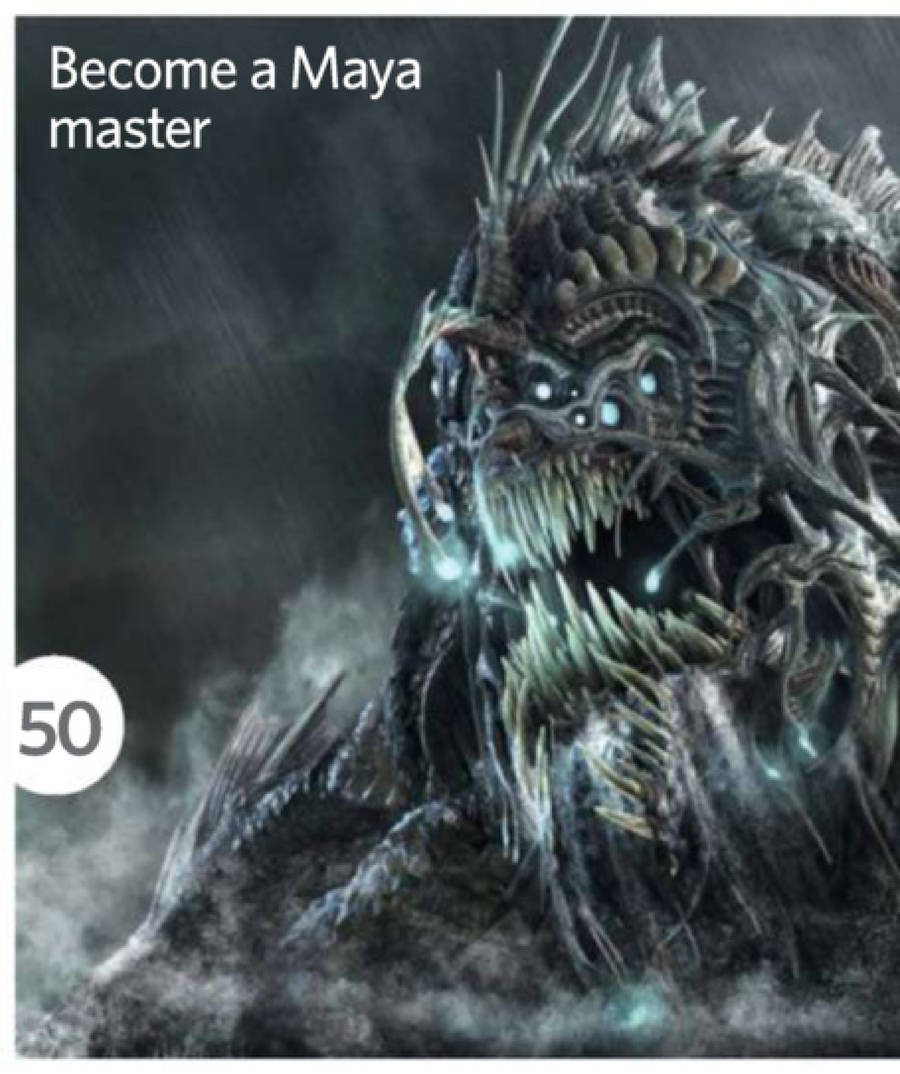

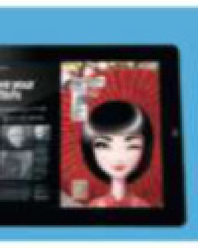

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Turn to page 84 for details

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“It doesn’t matter what you bring to us. We’re going to find a way to help you and everyone’s going to be passionate about it”

Murray Butler creative director at Framestore **Page 34**

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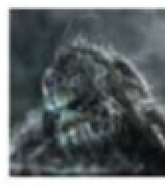

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Turn to page 112 for the complete list of the disc’s contents

WELCOME TO

THE GALLERY

Seven pages of great artwork from the 3D community

Images we love!

> The inspiration for this came from superhero comics, filled with exaggerated expressions. I came up with the idea of a super-girl celebrating her birthday and combined it with my own childhood memories, making her something of a troublemaker
>
> **Lin Zhang,** *Happy Birthday!*, 2014

> This image showcases how great composition can draw the viewer in. You can almost feel the force of the wind just by looking at the image
>
> **Chris** Editor

Have an image you feel passionate about? Get your artwork featured in these pages

Create your gallery today at **www.3dartistonline.com**

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Artist info

Lin Zhang

Lin works for Activision and Epic Games, and works on personal projects in his free time

Personal portfolio site
http://zerozhang.cgsociety.org

Country China

Software used Maya, 3ds Max, ZBrush, Photoshop, V-Ray

Work in progress...

We've always loved Mucha's detailed Art Nouveau style. The swirling flower tendrils here evoke his aesthetic, while framing the female model wonderfully

Chris Editor

I've admired the work of Alphonse Mucha for a long time and I wanted to create something of my own in his style. This female character pin-up reflects the tender and elegant mood of his work

Carlos Ortega Elizalde, *Stamens Of Light,* 2014

Artist info

Carlos Ortega Elizalde

3DArtistonline

Username: carlosortega3d

Personal portfolio site
www.zigrafus.com.mx

Country Mexico

Software used Maya, Marvelous Designer, Mudbox, Photoshop, ZBrush, Arnold

Work in progress...

GetMags

Artist info

Dragos Jieanu

Dragos is self-taught in the field of 3D. He is currently the creative director at INDG

Personal portfolio site
www.jieanu.com

Country Romania

Software used
3ds Max, V-Ray, Photoshop

Work in progress...

The use of perspective and lighting in Dragos's image beautifully sets the scene for this apocalyptic city, and the few living things left in it

Larissa Staff Writer

This is something I made for fun that took around two weeks to complete. The basic shapes are 3D, with some paint-over in Photoshop

Dragos Jieanu, *Underworld,* 2014

StoreMags.com

> This wise Tibetan monk was born as part of an ongoing personal project to experiment with new techniques and to learn expressive emotions
>
> **Hugues Giboire,** *The Teacher,* 2014

> Hugues always goes that extra mile to bring his character portraits to life. You can really read the knowledge on this teacher's face
>
>
>
> **Larissa** Staff Writer

Artist info

Hugues Giboire

Hugues is a freelancer with 20 years of experience. He spends his time exploring new outlets

Personal portfolio site
www.3Dpeyote.net

Country Canada

Software used
Mudbox, Maya, Octane Render

Work in progress...

“This alien creature was inspired by the cuddly portia jumping spider, as well as one of my favourite movies, *District 9*”

Koen Koopman, *Portia 581,* 2013

“Another excellent addition to Koen's unique portfolio of character design work. What a cool-looking alien!”

Larissa Staff Writer

Artist info

Koen Koopman

3DArtistonline

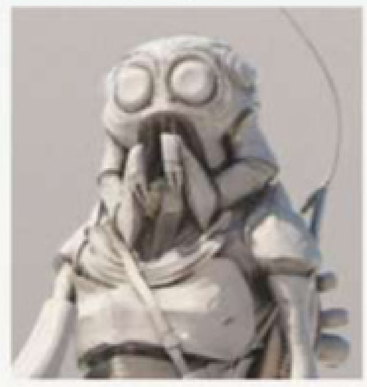
Username: TBKoen

Personal portfolio site
www.tubuh.nl

Country The Netherlands

Software used 3ds Max, Mudbox, After Effects, Photoshop, V-Ray

Work in progress...



Artist info

Frederik Storm

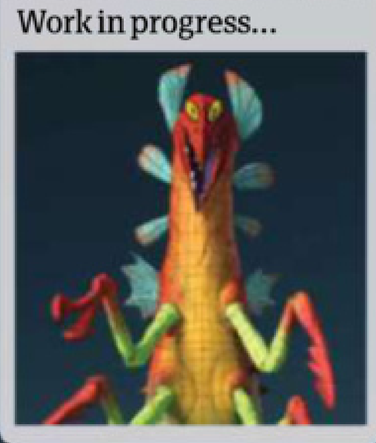
Frederik works as a freelance artist, specialising in character design, modelling and sculpting

Personal portfolio site
www.frederikstorm.dk

Country Denmark

Software used Maya, V-Ray, Photoshop, Mudbox, ZBrush

Work in progress...



"The idea came from a Japanese magazine featuring nothing but *Ultraman* monsters. I wanted to try out a new technique, using the limitations of low-poly to my advantage to get a unique look. The idea was to make it as cheap and fast as possible"

Frederik Storm, *Sea Kaiju*, 2014

"It's interesting to see a project in which limitations are a crucial part of the final design, rather than an element that must be worked around"

Larissa Staff Writer

海怪獣

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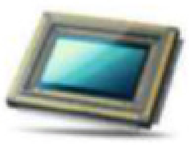

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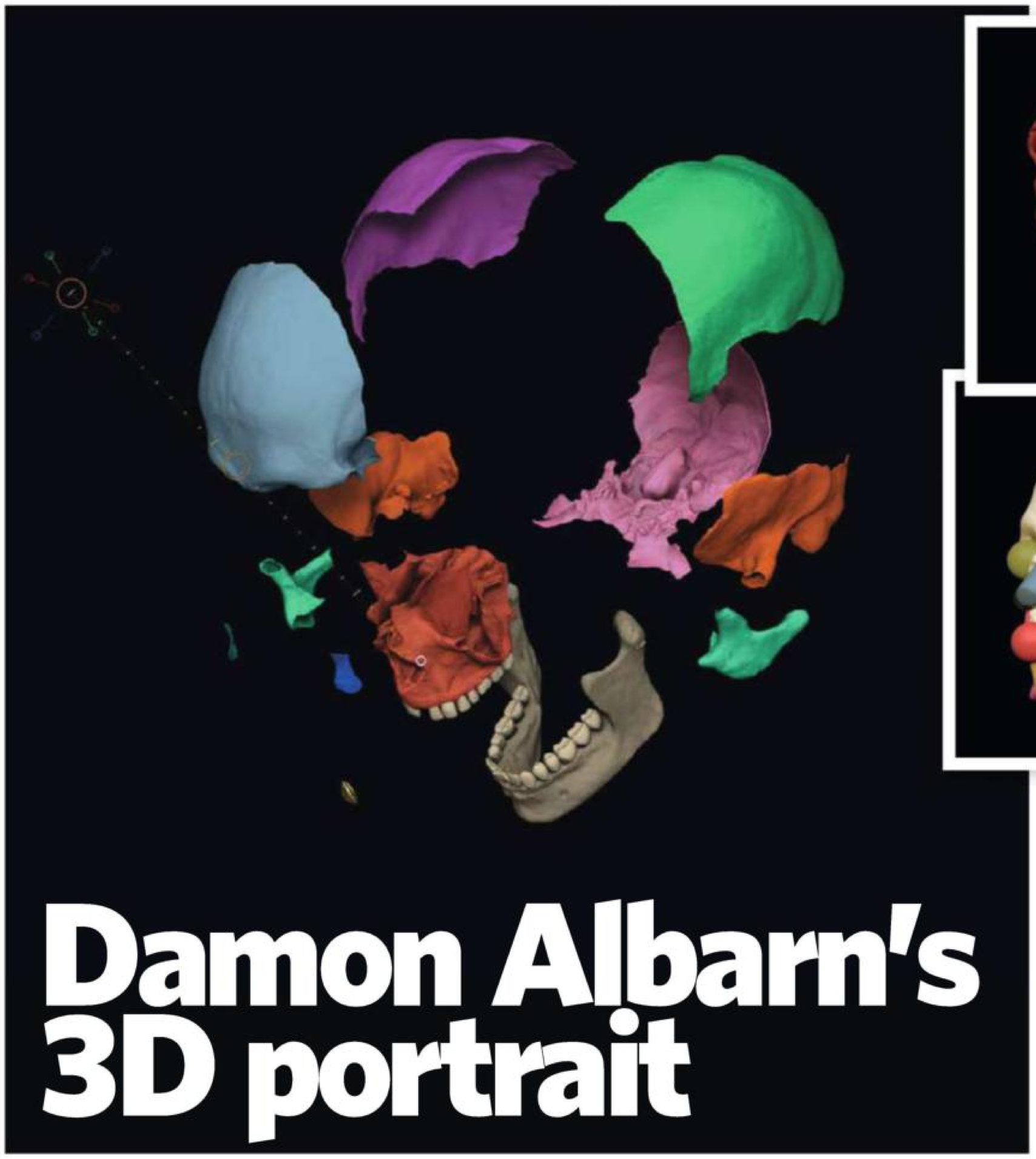
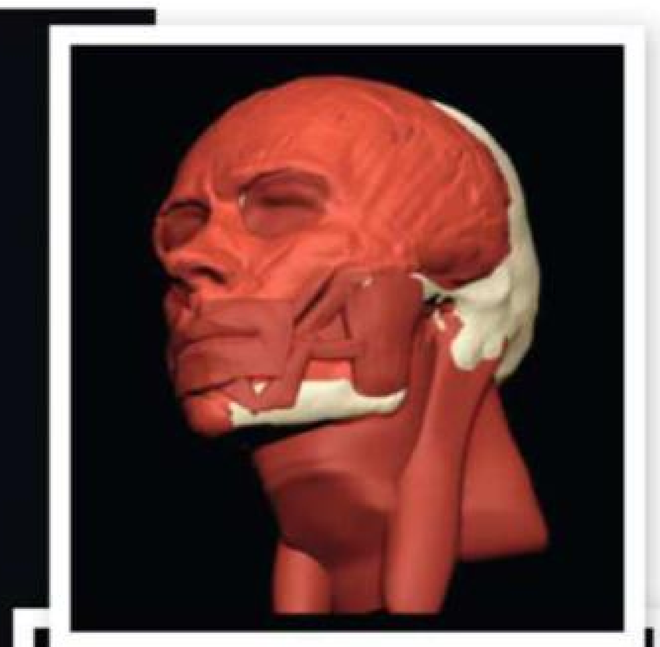
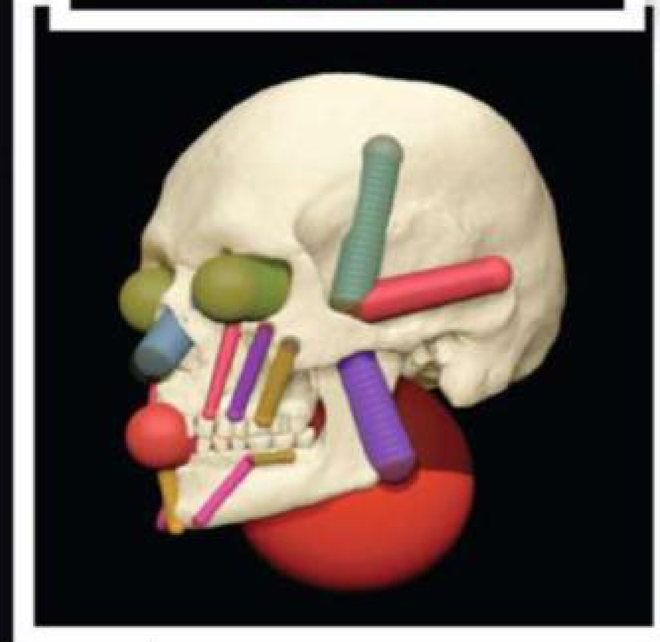






MAIN "A lot of people in that industry would be like, 'what are you doing? You can't use that, that's supposed to be the making of'," says Throup. "But that's the cool thing"

TOP "We had to screen capture, so we were dependent on hardware limitations and the human hand when sculpting something, rather than creating something to a spec that we might have wanted," explains Throup

BOTTOM Throup described the act of showing every element of the sculpting process as "a very refreshing thing to embrace"

Damon Albarn's 3D portrait

Creative director Aitor Throup discusses his experiences working on the fully ZBrush-based music video for Damon Albarn's *Everyday Robots*

Aitor Throup

PROJECT
Everyday Robots music video

WEBSITE
www.aitorthroup.com

SOFTWARE USED
ZBrush

For most 3D artists and onlookers alike, it is the final sculpts that result from hours of work in ZBrush that truly stun and amaze. For globally acclaimed artist and designer Aitor Throup, however, the software was so much more than that. To him, the ultimate sculpt produced was not the only thing worth admiring – the actual process of creation within ZBrush was also just as beautiful.

"When I first came across ZBrush, I just remember being really fascinated by the interface and the process of actually creating something with it," begins Throup, creative director on Damon Albarn's first solo album and single, *Everyday Robots*. "There's such a unique beauty in the things that aren't supposed to be seen."

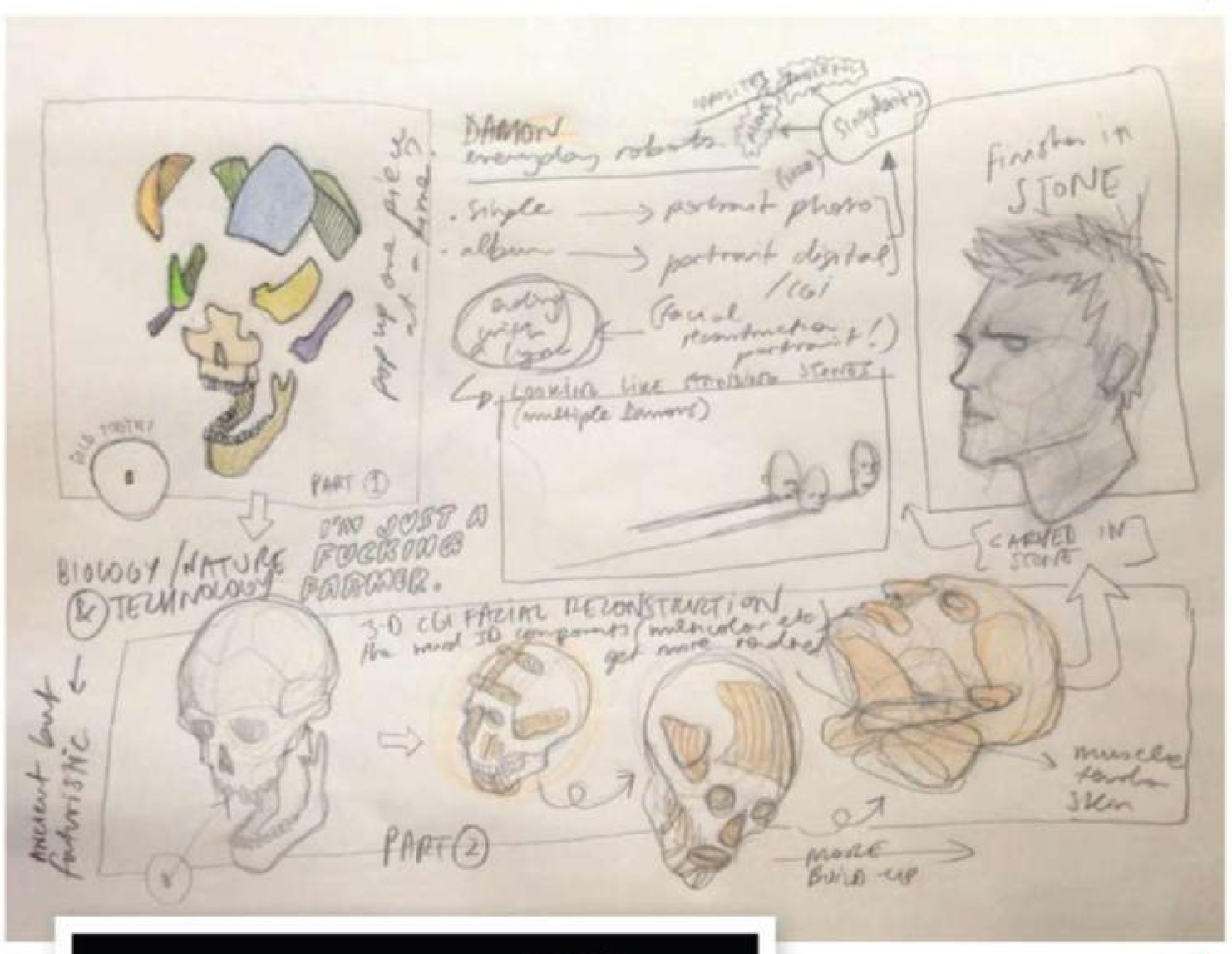
A self-proclaimed ZBrush geek, Throup started out learning about the basics of the program. He was initially interested in doing a series of portraits before starting work on the Blur and Gorillaz frontman's new music video. "I've worked with Damon a couple of times already – we met two and a half years ago and I'd always really looked up to him as an artist. I think that we share a similar approach to our work in that we are trying to push to define new things," he explains. "Very early on, when Damon started sampling his album and putting the first ideas down, he started talking to me about it and asked me to art direct it for him. For me, it was definitely a very exciting prospect, to give him a visual identity as a solo artist. Damon really helped to make sense of the idea that was floating

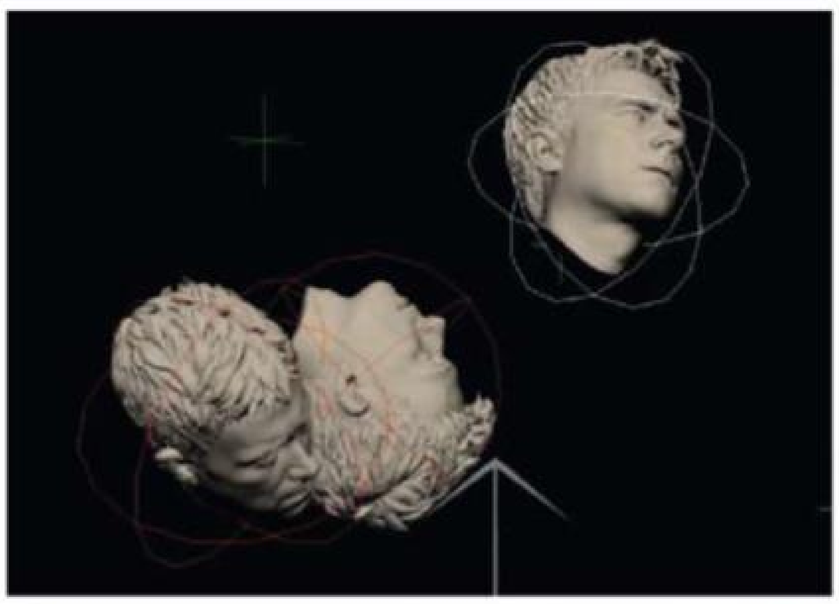
> I saw how a song could come alive through musical moments as well as the physical changes to the 3D object
>
> **Aitor Throup**

around in my mind. I saw how a song could come alive through musical moments as well as the physical changes of the 3D object."

Working with experienced ZBrush artists at Passion Pictures and even the owners of Pixologic itself, Throup began to create a video that delved into the multi-faceted process behind the complexity of a digital sculpt. Starting with cranial scans of Albarn's head, facial reconstruction techniques are used to build a realistic portrait of the artist throughout the video, which reveals the step-by-step production of the sculpt entirely within ZBrush. "It's not even an animation, it's just a screen-capture of the process that was then very laboriously speed-ramped and time remapped," explains Throup. He tells us that his main aim was to represent Damon Albarn as both a person and an artist in the most direct way possible – by representing the layered nature of his work in the layers of the music video's sculpt. "It's a new interpretation of what a portrait should do," he states. "I've always been interested in facial reconstruction and for me that's a real direct metaphor for a work of art. You end up with this head that is directly informed by the scan inside of it. It just has this inherent value, even though you can't see it. By the time you see the finished head it's so charged by the content because you know what is inside it and you've been involved in that process from the very start."

"ZBrush was an amazing medium compared to something like painting or drawing or sculpting – it was all of that, but in a way that enabled me to step out of my comfort zone," concludes Throup. "I just thought that it looked beautiful. Colour-coding groups of components and things like that – they were just incidental aesthetics based on the function of the tool. In the end, ZBrush was a very refreshing tool to embrace."





TOP Initial sketch of the idea. Throup worked with ZBrush artists experienced in the field and directed the action, but also learned the basics of the software

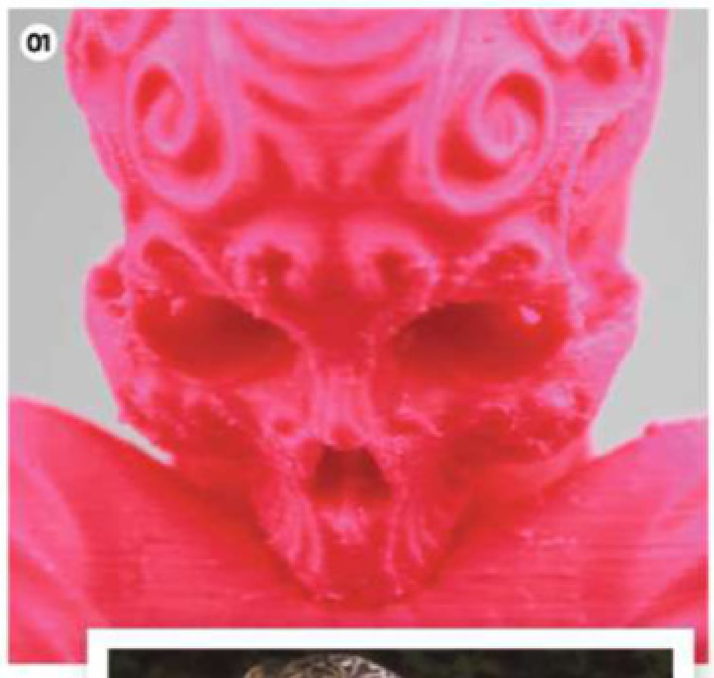
LEFT, BOTTOM The sculpting process, based on actual cranial scans of Damon Albarn's head. The layers are something of a metaphor, representing the layered approach to Albarn's music

Strange coincidences

Throup reveals how he first began seriously considering ZBrush for his work after a trip to LA

"It was a complete coincidence. I was in LA last year, working on the concepts and costumes for a film. I was speaking with all the 3D artists and they were all using ZBrush. I told them that I loved the program as they were basically illustrating some of my ideas – it was amazing. I was with my friend and his girlfriend later that evening, telling them about this experience with these artists using this program and how fascinated I was by it all. They said that it was crazy because the family of my friend's girlfriend own it – they own Pixologic! They were very excited to hear that I wanted to use ZBrush to work on this video. It was really useful as well, because of course I had to get specific clearances so that we could use the software for the final piece."

Valenzuela's Be Mine Valentine vase, his submission to MyMiniFactory's 3D design contest. He wanted to explore different ways to make a vase feel original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Designing for 3D print

The winner of MyMiniFactory's latest design competition, Marco Valenzuela, talks to **3D Artist** about how digital artists could become 3D printing specialists

After having worked in the industry creating characters, environments and animations for AAA games such as *TRON: Evolution* and the *WWE 2k* series, 3D artist Marco Valenzuela found himself wanting more from his virtual designs. "I became seriously interested in the advantages of 3D printing in 2006 when I was asked by Bill Bottorff to demo ZBrush modelling at a monthly Autodesk Animation User Group Association meeting," explains Valenzuela. "I felt liberated. Nearly anything I wanted to create could be 3D printed without a hiccup." Now working as a 3D print specialist and jewellery designer as well as a digital sculptor, Valenzuela tells us why he believes learning about design for 3D printing would benefit any 3D artist today.

Do you feel that 3D printing is simply too pricey and unattainable to start learning about it?

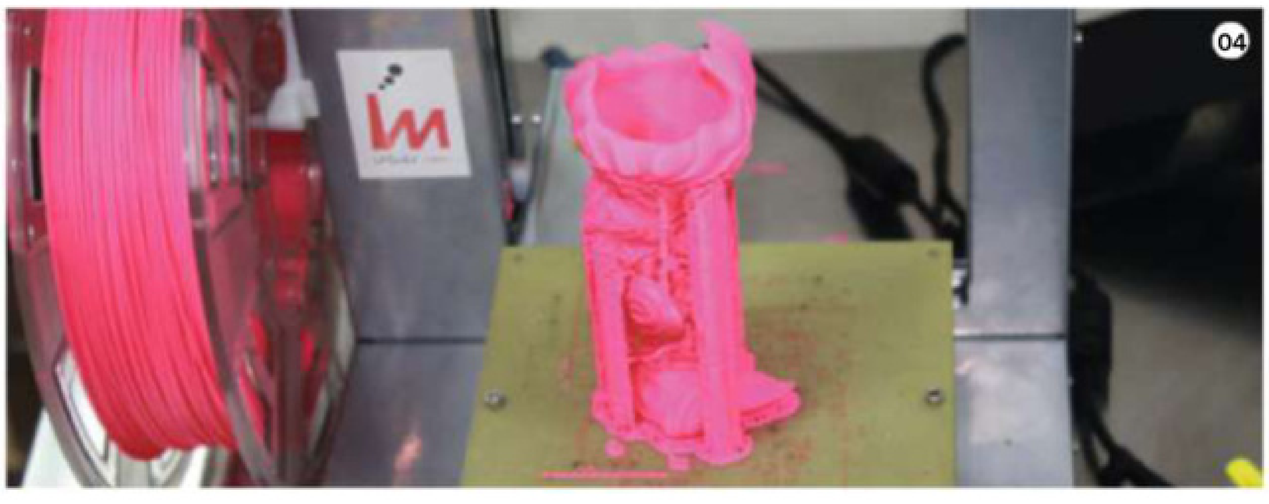
It would be wise for 3D artists to learn about designing for 3D print. The educational resources surrounding it are growing rapidly and it's possible to order 3D prints from many sites. Considering 3D printing is estimated to become a multi-billion dollar a year industry and that millions of jobs will be created in the 3D sector, artists of all types can benefit from this.

What do you have to look out for when designing a model for 3D printing as opposed to a model for, say, animation?

First, your mesh must be watertight. This means if the volume of the model was filled with water, none would pour out: no holes in the mesh. Secondly, monitor wall thickness closely. Keep in mind what material you are modelling in and make sure that you don't create something that might crack like an eggshell – a good rule of thumb is 2.5mm minimum wall thickness. Although many materials can produce thinner walls, this is the average minimum wall thickness that I have found to retain proper strength in a great variety of materials. Finally, clean modelling. Two-point polys, duplicate faces and flipped normals are all the typical issues that are bad for animation and are killer to 3D prints.

Do you feel that the number of individuals with the opportunity to create and sell their printed designs will grow in the future?

I believe that the future will involve customisation of everything by using 3D printers. 3D artists will certainly see more and more opportunities to sell and benefit from their 3D printed designs. My advice to others would be to participate in multiple 3D printing communities and to experiment. Don't become consumed with making a masterpiece for your first 3D print. Rather, start out by designing different models for a variety of materials and technologies.


04

01 The vase is embellished with intricate details and echoes the style of many of Valenzuela's other art and 3D printed sculpts. The vase is available to print from the MyMiniFactory library

02 Sterling silver skull ring designed by Valenzuela. The imagery of HR Giger and the Mexican Day of the Dead is a big influence on Valenzuela's digital art and 3D printed objects

03 A panther bike headlight, as designed by Marco Valenzuela

04 It's important to regulate the quality of the 3D print. Ensuring that your design is watertight and has thick enough walls are paramount to creating a successful 3D object

ART + TECH

A fusion of creativity

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Images of the month

Here are the illustrations that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month

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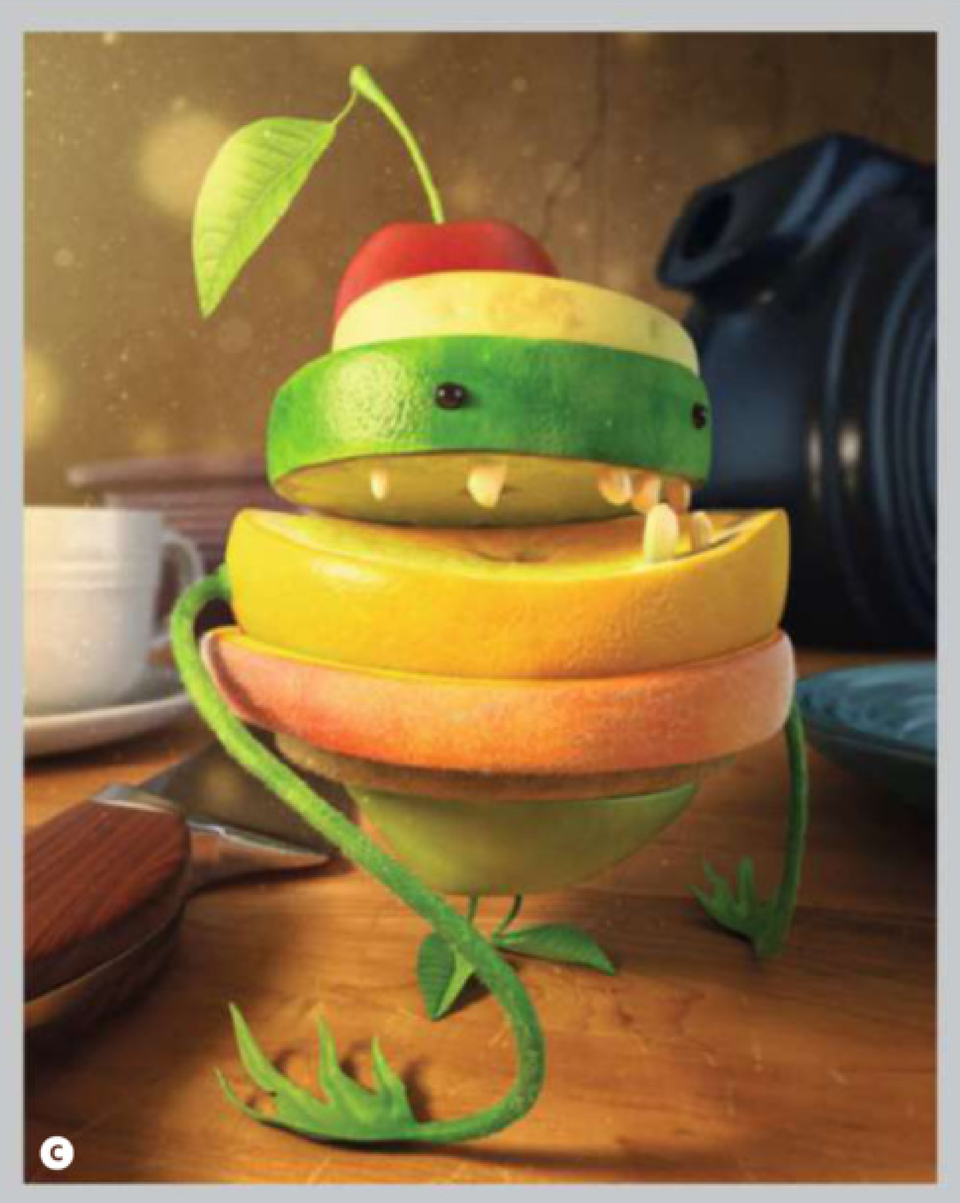
Register with us today at
3DArtist online.com
www.3dartistonline.com
to view the art and chat to the artists

A Lancia
» **Grigori Kliver**
3DA username AirJ
Grigori says: "This model was originally designed for an automotive contest with an Italian theme. I based this model on photographs of the vehicle, using 3ds Max, V-Ray and Photoshop for post-processing."
We say: *This is one classy car – they just don't make them like they used to! The juxtaposition with the grimy, rusted environment is what makes this really work, evoking a sense of 1950s crime capers.*

B Chaos Knight
» **Paul Massey**
3DA username EclipseCGI
Paul says: "I created this image to learn more about using ZBrush. This is the first full character that I created and all the modelling, sculpting and rendering was completed in ZBrush, with the post-production done in Photoshop."
We say: *For a project created with the aim of learning ZBrush, this is incredibly impressive work – we'd expect this level of detail and skill from a digital sculpting pro. We can't wait to see what else you come up with as you keep developing your ZBrush skills!*

C Fruitenstein
» **Peter Mai**
3DA username OhMai
Peter says: "This is a personal illustration that I did for an upcoming Spring art show at my current workplace. It was created using several programs, including Maya, V-Ray, ZBrush, Mudbox and Photoshop."
We say: *We're going to be honest here, if you take an object and anthropomorphise it in a cute and funny way, we're probably going to love it on the 3D Artist team. This little fella is no exception!*

D Fish Detective
» **Kamil Kuklo**
3DA username mookie
Kamil says: "This was my entry for a future detective-themed competition. The scene is based on the idea that the sea levels rose so much that the world is now controlled by fish. My character is a private eye that sits in his office trying to solve fishy cases."
We say: *When working with a theme like future detective, it could be so easy to just create another robot or cyborg – and there's nothing wrong with that! Still, a little imagination, as seen here, can go a long way to getting your work noticed.*



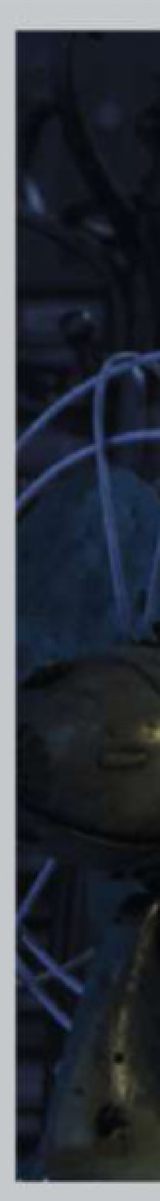
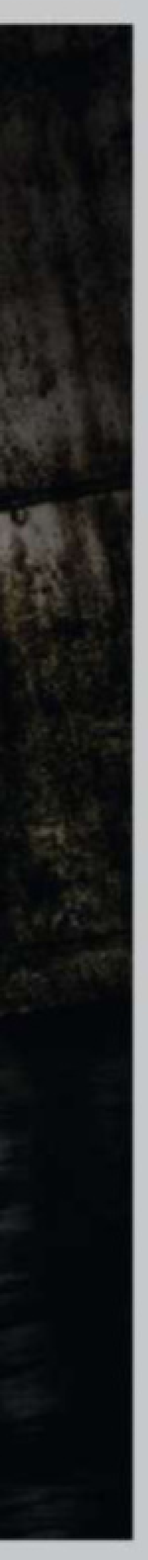


Image of the month



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Composition #6

» **Juan Siquier**

3DA username Siquier

Juan says: " This is a still life piece of a gramophone – pixels on canvas. It was created with 3ds Max, Maya, Photoshop and Arnold."

We say: *There's some rich use of colour in this image. It's almost impossible to look away! We particularly enjoy the engravings on the inside of the gramophone.*

Charlie Chaplin

» **Zuzanna Kucharska**

3DA username boboziutek

Zuzanna says: "This is my latest work – a sculpt of the actor Charlie Chaplin"

We say: *There's absolutely no way that you could mistake this character. It can be difficult to imbue a sculpt with the personality of the subject, but Zuzanna has done a really brilliant job of it here.*

Floater

» **Lars-Gunnar Thorell**

3DA username Dstort

Lars says: "This was sculpted from a concept made by my friend Gustav Dalerum. I sculpted it in ZBrush and rendered with V-Ray in CINEMA 4D."

We say: *There's definitely a sense of Hayao Miyazaki and Studio Ghibli in this image, but with a much darker edge.*

Stay in your lane

» **Alex Lanier**

3DA username Laniercreations

Alex says: "This image was created by combining 3D and 2D elements."

We say: *It's possible that we like this image so much because it brings back fond memories of playing* Burnout *late into the night. There's much to be said for the realistic crumpling of the metal and the use of 2D to add in the finer details, such as the smashed glass.*

Have your say

Email, Tweet or get in touch with us on Facebook to share your thoughts, opinions and proudest projects

Top tweets

Get involved... @3DArtist

@NinjaDragonKick My motorbike I made was published in 3D Artist issue 65. Couldn't be happier!

3D Artist Remember guys, if you send something in there's always a chance it could be published in the magazine!

@RobinSilcock Thanks for the follow, I love your magazines. They are the highlight of my postal month!

3D Artist We're glad to hear you enjoy it! We'll continue working hard to bring you the best CG content each issue

@gustavoahlen It is a pleasure to work with @3DArtist

3D Artist The pleasure is all ours!

@aleksTut Just got my *Sci-fi & Fantasy Art Book*. Can't wait to see what's inside. Let the fun begin!

3D Artist Send your creations to 3dartist@imagine-publishing.co.uk so we can take a look

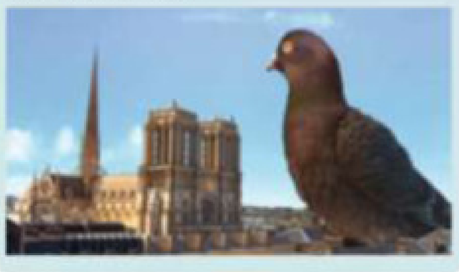
On the Wall

Facebook.com/3DArtistMagazine

Take a look at 'Douce Menace', a seriously impressive graduation film by five students at Supinfocom Arles!

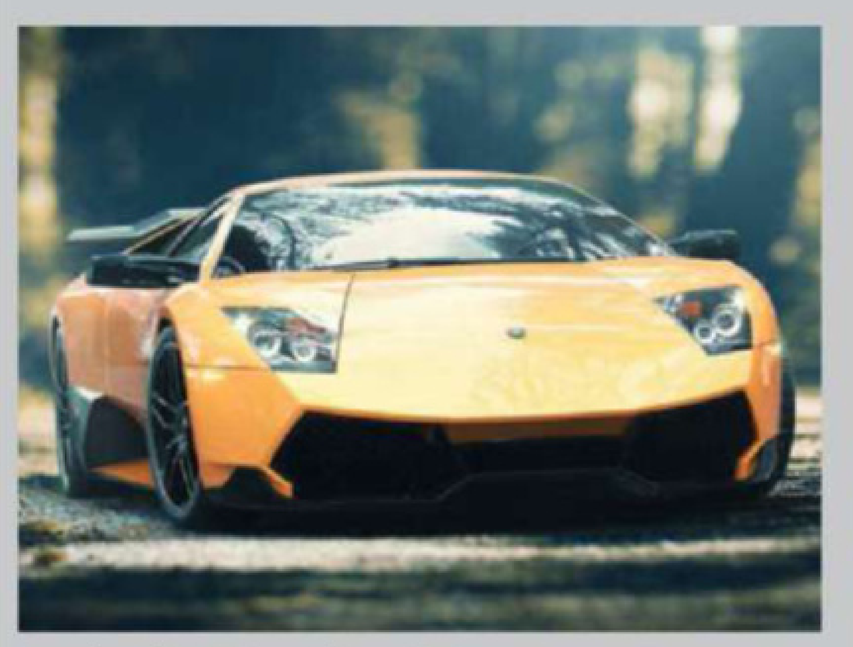
Durand David If all of this was done by only five people, just think what could be done by more. VFX is hard work.

Angel Piilani Burger I jumped at the gargoyle at 5:40!



If you want to have your work or thoughts displayed here, get in touch with us via email at **3dartist@imagine-publishing.co.uk**, via Facebook at **facebook.com/3DArtistMagazine** or on Twitter **@3DArtist**

Social media images of the month



Lamborghini Murcielago LP670-4 **Facebook likes** 1,389
» **Michael Kotoff**
We say: "The Lamborghini Murcielago has to be one of the coolest cars in existence today – Bruce Wayne drives one, after all. With such excellent use of lighting and rendering, this version looks almost indistinguishable from the real thing."

WIP of VI **Facebook likes** 3,631
» **Rafael Grassetti**
We say: "Sometimes it's the works in progress that will get the most love on our Facebook page, as was the case with this fantastic character work by Rafael. Just check out the awesome detail and the bursting colour of the character's hair!"

Highway Duel

I finally finished my animated car chase last year, 'Highway Duel'. It was created with 3ds Max in my spare time over six years. I used this animation to improve my cinematography and editing skills. I hope that you like some of the car photography! Thanks,

Auburn Hodgson, via Facebook

Thanks for sharing, Auburn! This certainly showcases your eye for cinematography and some great editing techniques. You'll be working on the next Fast & Furious *in no time!*

YOUR TOP WALL POSTS

Mitsuba render test
» **Filippo Veniero**
Filippo says: "This is a Mitsuba render test, using a single emission light, photon mapping and post-production in GIMP. It was 100 per cent created with open source tools Blender, Mitsuba and GIMP on the Ubuntu OS."

Lighting study
» **Eder Xavier**
Eder says: "This was a lighting study that I created recently using V-Ray, 3ds Max and Photoshop."

ZBrush 4R6®

with ZRemesher

(automatic re-topology feature)

available now

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ZClassroom.com
ZBrushCentral.com

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makers of ZBrush®

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ZBRUSH SECRETS REVEALED

ZBrush is one of the most innovative, practical and artist-friendly tools in the industry today. We asked some of its most talented users to reveal their tips and tricks for sculpting out success

With ZBrush now in its fifteenth year, it's sometimes easy to forget just how much the digital sculpting software has revolutionised not just modelling, but the whole computer graphics industry. In the same year that the ZBrush Debut Version .90 – the first version to ever to be released commercially – was unveiled, it received the 1999 Innovation Award from *Computer Graphics World*. Only a few months later, ZBrush was awarded Best of Show at Pixologic's very first MacWorld Expo.

For the first time, 3D artists were encouraged to create their sculpts without the use of calculations, wireframes or NURBS. Instead they could use a toolset that was so similar to real-world sculpting that today, many traditional artists find it easier to start creating their initial sculpts in ZBrush. The software wasn't overly expensive, it was easy to use and, most importantly, it enabled artists to create computer graphics organically. Simply put, it put the art back into 3D art, allowing those who think visually rather than scientifically the opportunity to bring their imagination to life on a computer screen.

Of course, ZBrush has changed a lot since its initial release, now offering a plethora of essential tools that allow for the creation of beautifully detailed assets. The latest version alone, ZBrush 4R6, has introduced a host of new tools, such as the Trim Curve brushes and the game-changing retopology solution ZRemesher.

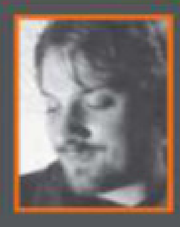
It's easily one of the most popular digital sculpting solutions on market today. As such, we asked some of the best ZBrush professionals in the world to reveal their top tools, tips and techniques for creating those perfect 3D sculpts.

Barbarian Jason Martin

THE EXPERTS

Francis Bezooyen

Website www.fbbportfolio.com
Company/title Modelling and surfacing artist. Previously a senior surfacing artist at Rainmaker Entertainment
Location Canada

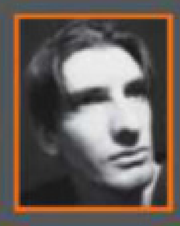


Tyler C. Bolyard

Website www.TyrassicInc.com
Company/title Freelance artist. Past clients include Duncan Studio, Gnomon Studios and the Jim Henson Company
Location USA

Tian Cocker

Website www.tiancocker.com
Company/title Lead artist at RealtimeUK. He is inspired by anatomy and specialises in digital sculpture
Location UK

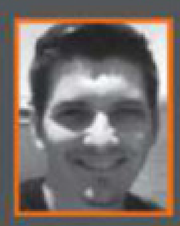


Alexander Filiuk

Website www.alexiall.cghub.com
Company/title 3D character modeller. You can view his **3DArtistOnline** profile by searching the username Alexiall
Location Russia

Maxence Fleuret

Website www.mfleuretart.com
Company/title Character design artist at Insomniac Games CA, digital sculptor for Arh Studios, and ZBrush trainer
Location USA



Carles Gonzalez

Website www.cgselworks.com
Company/title Freelance character artist. He has been working in the film and gaming industries for over five years
Location Spain

Jason Martin

Website www.believerdeceiver.com
Company/title Currently working in the gaming industry as lead character artist at id Software
Location USA

Jose Augusto Rodríguez Sepúlveda

Website www.jrs3d.com
Company/title Character artist working in both 2D and 3D since 2001
Location Spain

Maximilian Gordon Vogt

Website www.gordon-v.de
Company/title Worked at Framestore London and is now a freelance VFX and concept artist specialising in modelling
Location Germany

Steve Chinhsuan Wang

Website www.sketchshido.com
Company/title Concept designer in the gaming industry, currently working on an upcoming title for Piranha Games
Location Canada

Bryan Wynia

Website www.bryanwynia.blogspot.com
Company/title Senior character artist at Hi-Rez Studios. Previously worked at Sony and Naughty Dog
Location USA

Zhelong Xu

Website www.zhelong.cghub.com
Company/title Freelance 3D artist whose skills lie primarily with ZBrush and 3ds Max
Location China

50 ZBrush secrets revealed

storemags.com

1. Hessian

Helmet I started with a DynaMesh sphere and manipulated it into the basic shape. I then used Dam Standard and hPolish brushes to clean up the surface along with the ClayPolish feature. After I was happy with the main shape, I painted masks for the lion and plaque details and created extractions, then detailed each piece separately

Spear The spear was created almost entirely within Maya using basic box modelling techniques. I use this method for most planar hard surface objects to achieve proper topology right away and to have control over edge loops. After UVing the objects I imported them into ZBrush and used a combination of the Dam Standard and Slash brushes to give it a worn look

Head I began with a DynaMesh sphere and used the Move brush to get the basic shape and proportion. After the overall form was built, I used a combination of Clay Tubes, Standard and Dam Standard brushes to create the details. I then exported to Maya for retopology with the new modelling toolkit. Finally I brought it back to ZBrush for detail projection, polypainting and final Alpha details

Hair For the hair I began sculpting basic forms to get an idea of the mass and style I wanted, so it would match the concept. I then created Polygroup sections on the head where I wanted to the hair to grow from and masked off those areas. After I was happy with the hairstyle, I exported the curves to Maya and applied an nHair system for rendering in V-Ray

Clothing I first sculpted the collared shirt and suede coat as one piece from a DynaMesh sphere. After I was happy with the forms, I exported it to Maya and used the modelling toolkit to retopologise them as separate meshes. I also used DynaMesh for the ruffle and used extractions for the belts, then retopologised it all in Maya

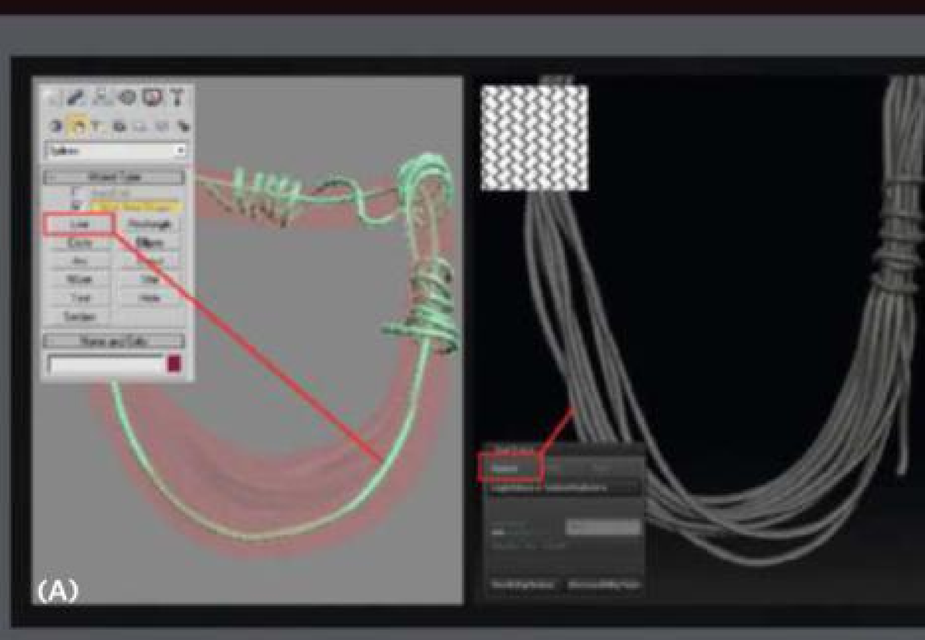
2. Resolution When starting a sculpt stay as low poly as you can for as long as possible. Only divide up a level when it's absolutely necessary. A lot of beginners seem to divide as much as possible and start on details way too soon. You will achieve the best results with patience and by breaking things down into primary, secondary and tertiary forms.

3. Story Whether you're creating a character, an environment or a prop, try to think about a backstory for the piece and immerse yourself in it. When you can explain why you chose to create things a certain way, it will give your work a deeper sense of character and understanding and will make it so much more convincing.

4. Dimensionality Make sure to constantly rotate your model as you work and try not to remain on any one view for an extended period of time. This will ensure that your work looks appealing from all angles and will give your piece a lot of depth and a sense of dimensionality.

5. Customise your layout Customising your interface will save you a lot of time and it's a great way to always have your most-used brushes and materials to hand. Go to Preferences>Config> Enable Customize. Select any tool you want and drag it to your desired place on the interface. You can even set a shortcut for each brush.

6. Change the ZMaterials A model is going well when looks good in different materials and with different light information and shading. Change these from time to time to check how the model responds. I usually work with the basic



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material because you can change light direction in real-time. However, there are great materials with shiny specs or others that simulate wax or skin.

7. Extracting colour information

I usually use polypaint and ZAppLink for my textures. I make a Color pass in all the SubTools so it's easy to select all the pieces in the UV layout when you bake them. You can also make a Color Detailed pass or a Dirt pass for reference so you know where everything falls in the final texture.

8. Balance your priorities

The portrait section of a character often demands particular attention. You should put more concentration into high-priority geometry sections, such as those which will be seen more frequently and more closely than others. However, we should never forget about balance. Build up every element of your entire character at the same time and make sure that all the forms you create work well with each other. The model must look complete. Although you should concentrate on the highly visible areas, the sections seen less frequently mustn't appear to be inferior.

9. New technology A trend towards hyperrealism has been evident lately, witnessed in various model implementation techniques (3D scans, packages for physical simulation of materials and so on). Up to a point, this tech can substitute artistic and practical skills with specialised technical tools. These techniques should be used as a training manual – they help to teach certain nuances and obtain a deeper understanding of certain artistic aspects. The acquired knowledge can subsequently be used as a reference point.

10. Marcus

Marcus was created for the independent Alpha Force project, which was made by several 3D artists in our spare time. The project has a kind of post-apocalyptic feel to it, with emphasis placed on science fiction technology.

Originally, I used a simple geometry so that I would have further opportunities to find a suitable general shape for the character. Once I found the right shape, I had to think of what specific materials the character should be built with. I found that I was constantly adding new elements and contours to the model during the creation process, particularly while I was still searching for references.

Rope This character has a very large number of splines. **(A)** shows how I made the rope wrapped around his neck. I added a thin cylinder along a spline and then I made a UV layout for this geometry. I then added the texture of the rope using NoiseMaker. The next step was to clone the rope several times, giving each loop of rope a unique shape.

Clothes Working with so many polygons was quite difficult and time-consuming, so I had to split the model into separate parts and make each of them into different ZBrush scenes. After each of the separate parts were ready, I combined all the SubTools together and optimised geometry using the Decimation Master plug-in. I then combined these parts together in the overall scene **(B)**.

Never forget about balance. Build up every element at the same time and make sure that all forms work well with each other

Alexander Filiuk

50 ZBrush secrets revealed

storemags.com

11. Silhouettes Focus on the silhouette of your design. By ensuring that your character has a strong silhouette, it will enable the character to be read at a distance, from multiple angles and when standing with other characters on-screen. Bear this in mind when you start your design, as it will provide a strong start to your sculpting process.

12. Accessories Shadow Box, ZBrush primitives, and mesh extracts are great ways to add accessories to your characters. I have created everything from armour and clothing to weapons and jewellery with these tools. You can easily add new elements to your designs without having to leave ZBrush. They are quick and powerful tools and I highly recommend using them.

13. Material creation Do not rely on texture work or photo overlays to define materials. Even with a flat, grey surface, we should be able to tell what the material is made of. Having a variety of materials on a character is also important – I try to include a minimum of three different materials to introduce interest and contrast.

14. Masks Using masks is another great way to sculpt. You can use masks to create overlapping shapes, almost like scales. I like to use the Mask By Cavity feature in conjunction with the Inflate brush to create heavy folds, similar to rhinoceros skin. You can blur the mask by tapping on the masked area to create an even more organic look with incredibly simple techniques.

15. See-through Located at the top of ZBrush you will find an option called See-through. This feature is great when using large numbers of references. You can cover the workspace with a variety of images that will help your sculpting process, and the See-through option will enable you to toggle the opacity of ZBrush, meaning the references can act as a blueprint while you work.

16. Design creatively Always try to be as creative as possible with your designs. Once I get an idea in my head I'll hit the internet, books or films to further inspire me. If you are creating a creature, it's always good to start from nature. Everything stems from nature, so it's the best place to look to understand how things work. By using nature, you'll be able to build a solid foundation.

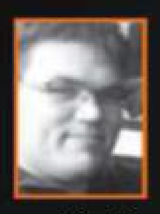
17. Reference sheets Once your idea is solid, it's a good idea to start an image board or a reference sheet. Collect all your images that you've found into one image board and constantly refer to it during the project. If you can put it on a second monitor then do so, as it means it's constantly there for you to refer to.

18. Push the design Don't be afraid to break the design, to push forms or to exaggerate. I prefer to push a design until it breaks and then throttle it back. Go crazy and liberate your ideas – if it doesn't work out, there's always the Undo button.

19. Hair creation When using FiberMesh, try making a few tufts of hair and then duplicating and mixing them together to composite a unique look with variations between the tufts. It can be quite frustrating trying to achieve your desired result out of one giant generation of FiberMesh. I usually make several chunks that I move around, brush and manipulate to achieve a certain look.

20. The Alpha palette There is a lot more in the standard Alpha palette that comes with ZBrush than you might think. Try manipulating and changing the Blur, Intensity, Contrast and Radius sliders of a few of the standard Alphas and you might be shocked by the number of variations you can find. I have a few custom Alphas that I added here and there, but I still call on the classics. You can manipulate many of them into different random properties that become extremely useful for both sculpting and polypainting.

21. ClayPolish ClayPolish can be a neat way to add some interesting surface aberrations on organic models. Of course, it works really well in achieving smooth surfaces with hard surface designs, but it's worth trying it out with organics as well. By adjusting the different sliders, you can create some really unique results.



22. Using ZRemesher

"I began this sculpt in an attempt to get back into doing real art, rather than tinkering with the technicalities of working in CG," explains Bezooyen, telling us that the original concept for the sculpt was that of a ballet dancer. "My goal was for this sculpt to convey a sense of joy and freedom of spirit – a release of the soul from worldly troubles. When I designed the pose, instead of referencing images of dancers, I simply followed my gut feeling for what I wanted to convey.

"For sculpting projects like this one, I prefer that which has become a common workflow for many ZBrush artists – starting my model in DynaMesh then, since DynaMesh produces many triangles which can interfere with sculpting finer details, I use ZRemesher to get a clean sculpting topology with few, if any, triangles. On a human figure, I rough out each appendage from the arms and legs, to the fingers, toes, ears and the nose in DynaMesh, then retopologise the result with ZRemesher.

"With this approach, I have the advantage of being able to keep my DynaMesh resolution low, which keeps the mesh comfortably responsive. When I sculpt, I prefer as low a resolution as possible for my retopology, then I subdivide the result, project any important details that are missing from the DynaMesh and start sculpting in greater detail. I repeat the ZRemesher process as often as needed to get better topology in areas that have significantly changed shape."

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23. Creating a Character Head

Step 1 For this character I started out with a simple primitive sphere that I converted to a DynaMesh to prep for a silhouette. Spheres are obvious choices for heads because the basic volume makes sense and with DynaMesh you can effectively turn a sphere into anything you want.

Step 2 By using symmetry with the Move, Standard and Clay Tubes brush, start exploring the silhouette by quickly manipulating the mesh. Don't be afraid to go crazy – you can always undo.

Step 3 Next, continue refining the sculpt by using Clay Tubes and Smooth brushes and add in the features of the face. Use DynaMesh whenever you need more topology.

Step 4 This is a good time to add in the teeth and eyes. Split them into separate SubTools for rendering and setting up different materials. This will also add depth and shadows to the overall piece. I usually split most elements of a mesh into their own separate SubTool.

Step 5 For the teeth, mask out their shape with symmetry applied and do a simple extract to get a new mesh as a separate SubTool. A quick DynaMesh with smoothing, pushing and pulling can easily build a nicely shaped tooth that you can repeatedly duplicate to give him a full set.

Step 6 For the eyes I prefer to separate the cornea from the eyeball. This will add to the realism when you render it out. For the eyeball, inset the iris and for the cornea, slightly bump out the lens. When you have them both modelled out, overlay them on top of each other and make sure the cornea is inflated slightly so it has some minor negative space between the cornea and the eyeball. Set the cornea to transparent when you render it with BPR.

Step 7 This is where we get into detail and polish, using Clay Tubes, Standard, Dam Standard and Smooth brushes at a more refined level. For the wrinkles and skin details, use Alphas applied to the Standard brush. With the combination of Alphas with different brush setting such as Spray and DragRect, you can quickly add high-frequency details to your mesh. Once you have some nice Alpha detail placed into the mesh, go back over certain spots with the Standard or Clay brush and boost or smooth out areas to add more variation. This really helps to break up the details and adds to the believability.

Step 8 At this point it's a good idea to build out any accessories for the character. These were all created from basic primitives that were manipulated and tweaked into shape by DynaMesh, the Move tool and a few brushes. High-frequency detail was added with NoiseMaker.

Step 9 With everything polished, it's a good time to add hair to the ears. I prefer to generate a few tufts of hair with FiberMesh. Once you have a few tufts you like, start duplicating and moving them into place. Make sure you have Automask FiberMesh off in the Brush Automasking palette or the roots will be anchored in place and you wont be able to move the tufts around.

Step 10 Now it's time for some polypaint. I generally like to go down to a lower subdivision to start to paint as it's very easy to blend colours at a lower subdivision. If you're stuck with a dense DynaMesh, duplicate it and decimate the mesh to a reasonable level and use ZRemesher to get a solid base mesh. Take that mesh and subdivide it, then reproject that mesh over your original DynaMesh. Now you have a clean mesh with subdivision. Use the Smooth brush to blend the colours, which works well at lower subdivisions. I generally pick two colours and blend between them – in this case, it was pink and purple. Once you have a solid base colour, go up in subdivision and use Alphas with the Standard brush to paint in details.

Step 11 From here, duplicate this process for the remaining SubTools, testing different materials along the way. For the head I used the basic material. For the final composition, combine several shaders through the use of the quad- and tri-shaders to get interesting results.

Step 12 Ultimately, I decided to give my character an expression to give him more personality. For my final renders I used a basic lightcap set-up with a key light, fill light, and a rim, and used BPR for the final render.

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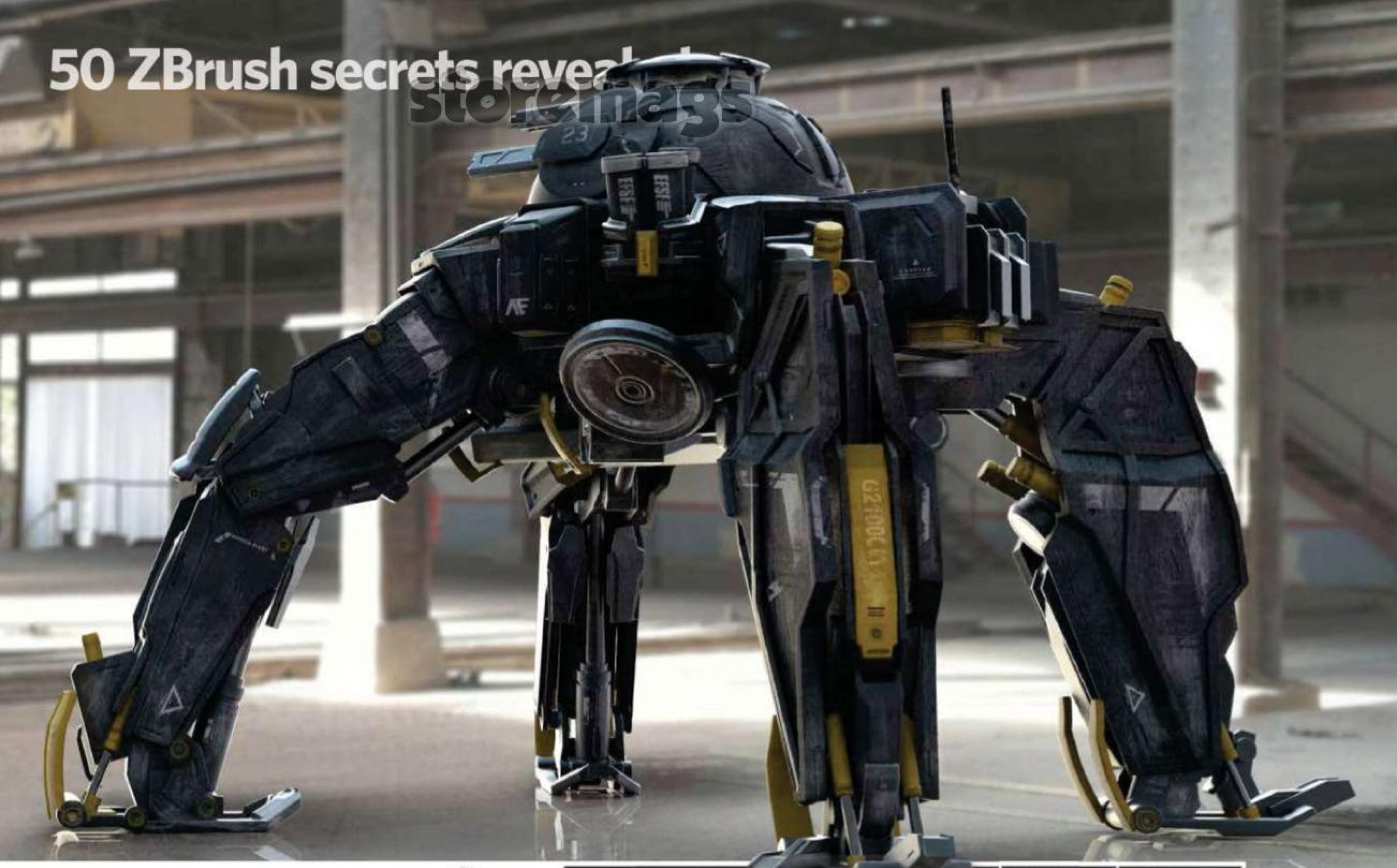

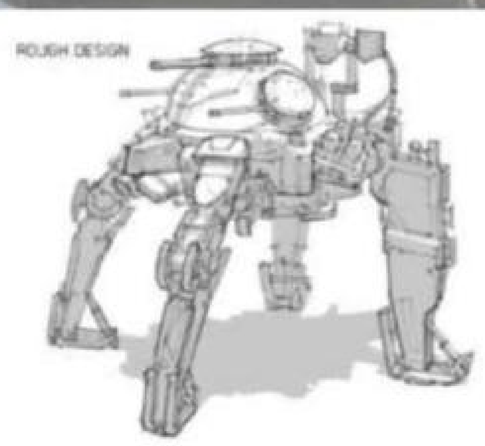

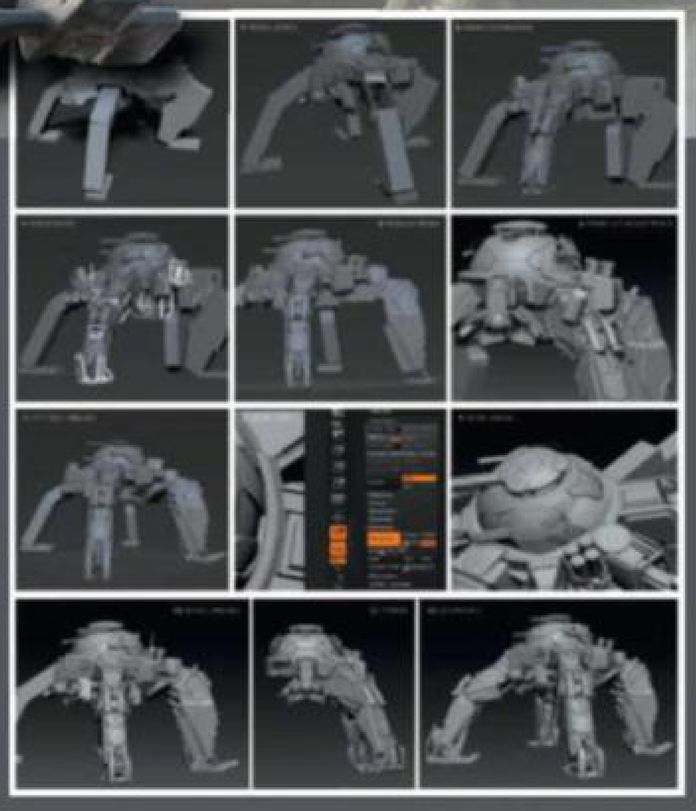

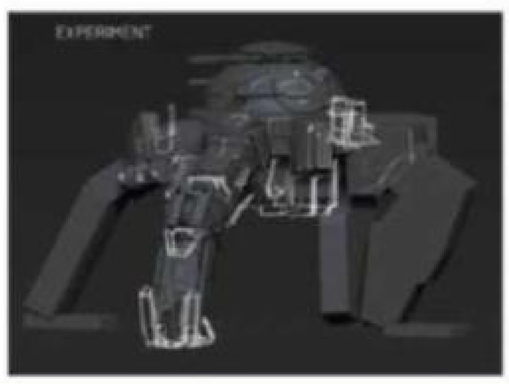

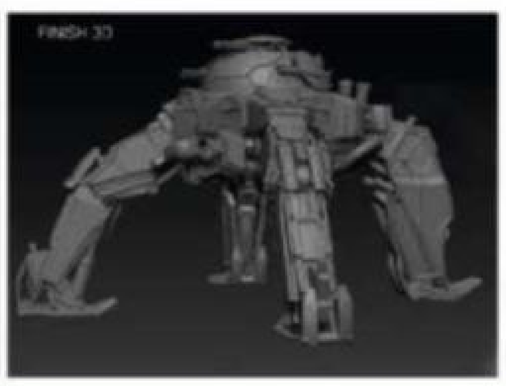

24. H23 MAM Mech design

Step 1 When designing a unique and eye-catching mech, the initial sketch is a vital part of the creative process. In the example we're using here, I used John Park's thumbnail technique to generate quick designs, then sketched my favourite thumbnail on paper.

Step 2 Start blocking in the big forms. At this point you can still make big design changes, but try to replicate your sketch. Check that the proportions work in most views, not just from the front. I always use DynaMesh on every part to about 300-400 for hard surface parts. The big forms were created using Masking, Clipcurve and Transpose.

Step 3 The most common tools I've used for most of my hard surface designs are Snakehook, Dam Standard, Smooth, TrimDynamic, Mask, Clipcurve, Extract and Transpose. I try not to use any kit-bashing kits online. The only unique brushes and Alphas were just bolts and other details that I added in later.

Step 4 To save time and make quick design decisions, I often screenshot the WIP sculpt and do direct Photoshop sketch-overs. This gives me confidence because it helps visualise the final product quicker – sometimes the first half of a sculpt can be a frustrating experience because what's on the screen doesn't look as good as you expect.

Step 5 It's also important to note that most of the modelling is superficial. I knew I'd be presenting this design as images, so I didn't bother making working joints. Many of the little details can be added in Photoshop.

Step 6 I usually model only half of the mech first to make sure my computer runs smoothly – this also makes the last mirroring stage a pleasant surprise. Make sure you set hotkeys for basic functions to speed up the pipeline.

Step 7 I like to complete a leg before I move on to another, but this is a personal preference. However, I'm not afraid to make design changes accordingly. Notice how the shell of the front leg changed after I've completed the back leg.

Step 8 Once you're about 60 per cent done, you can start reusing the parts that look cool. Leg shell, cylinders and boxes are parts that I edited and reused in my project.

Step 9 The last stage is detailing. I use custom brushes for holes and cutlines. At this point, you can try increasing the subdivision level to three to ensure the details are crisp.

Step 10 Mirror the completed side of the mech and merge any identical parts. This will save time when rendering. At this stage, it's all about playing with lighting. Lastly, add details such as surface scratches and graphics in Photoshop to make it seem more realistic.

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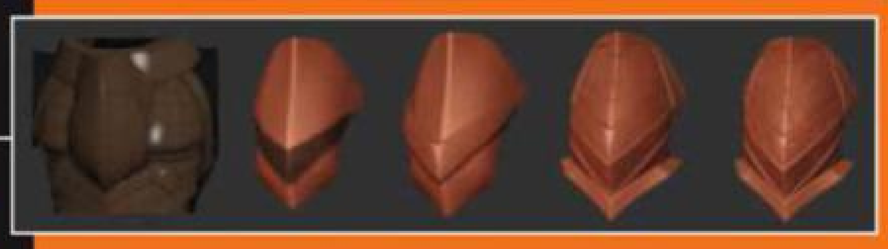
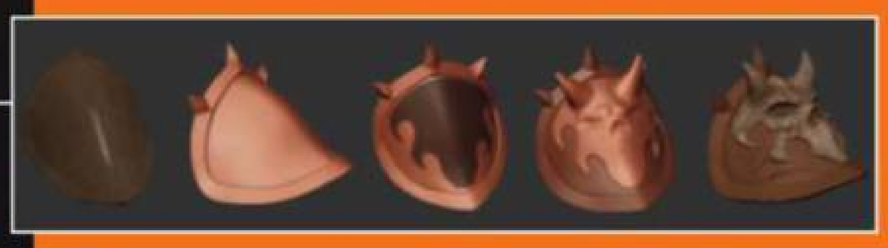




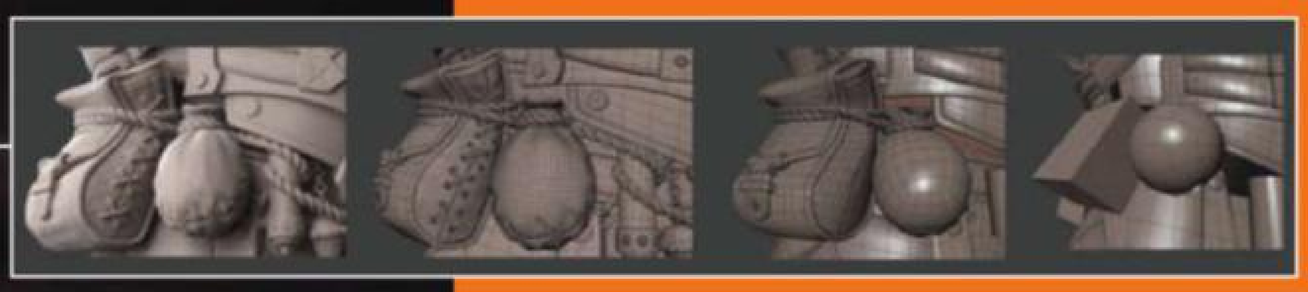
Heavy Knight

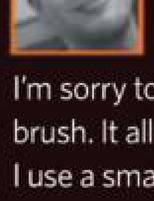
25. Bags These objects are the ones that went through the most changes during the process of creating this image. First of all I prepared their position with simple geometries and then I created some objects similar in form and volume. When they had better form and I understood how they leaned on other objects, I added the details

26. Head The head was created using DynaMesh. Once the shape and the volumes were suitable, I went through retopology using TopoGun and unwrapping UVs with UVLayout. I projected high details in ZBrush

27. Armour creation The armour was achieved using a very basic base dome in 3ds Max and by creating each independent piece with masks, extracts and retopology on the surface.

The shoulder blade section of the armour started as a simple piece in 3ds Max. I worked up the design in ZBrush and painted a mask with the form of the skull. I then went in and sculpted out the rest of the details using DynaMesh





28. Reference for every angle It is very important to use photos or images as a reference for every single view. You have to bear in mind that you are creating a 3D model with many different views, not just the front or the side. If your character has angles, these angles must be aesthetically present in all possible views.

29. Use Polygroups It is easier if you create several different Polygroups in your model, so that you can hide the torso to work on the arms, for example, or the body so that you can work on the isolated head. This is very helpful in cases where the arms are very close to the body.

30. Clip brushes This is another brilliant tool in ZBrush with which you can cut or eliminate parts of your model. Using it in combination with DynaMesh means that you can create pieces with hard surfaces and make silhouettes in a more precise way than manually, particularly when the level of detail is high.

31. Brushes I often get asked what brushes and settings I use. Beginners in particular think that it must be that one magic brush that makes it all happen. I'm sorry to disappoint, but there's no such magic brush. It all comes down to practice – and a lot of it. I use a small selection of brushes most of the time, particularly the Standard, Clay Buildup, Move, Move Topological, Inflate and Dam Standard. These are all the brushes that are necessary to create almost any surface form.

32. Layers and Morph Targets If your design is at a stage where the topology won't change, you can start to introduce changes and save them in layers. This way, you can mix and match different proportions and details saved on different layers to get interesting results. Using Morph Targets on top of this will enable you to then work on separate parts of the character exclusively.

33. Frankensteining Using different parts of models previously created to quickly kit-bash a new character can be a big time saver. This can be easily be done with the Insert brushes and DynaMesh. This is a good way to get a headstart by creating a basemesh to start the design.

34. DynaMesh Project When sketching a full character from basic shapes to full detail, you can lose surface form and detail when recalculating DynaMesh topology. In the DynaMesh option box there is a toggle button labelled Project. If turned on, it will automatically reproject all details when re-creating the DynaMesh topology. Very useful.

35. Smoothing details There are different ways to smooth in ZBrush. If you press Shift you get the normal smooth. If you hit shift, start brushing on the surface and then let go of the Shift button you can access the alternate smoothing algorithm. This means that ZBrush won't just smooth out details, it will try to relax the topology as well. It's a good way to avoid unwanted artefacts when you are smoothing triangles in a mesh.

36. Replay last When sculpting details like scratches you can set the intensity of your brush to very low. Once you place your stroke, the result will be very shallow. Now go into the Stroke menu and click on the Replay Last option under Modifiers. It will redo the exact last stroke you did on top of the first one. Repeat until you get the desired effect.

> I often get asked what brushes and settings I use. Beginners in particular think that it must be that one magic brush that makes it all happen. I'm sorry to disappoint, but there's no such magic brush. It all comes down to practice
>
> **Maximilian Gordon Vogt**

50 ZBrush secrets revealed

39. Posing I decided to rig and pose the base meshes in Maya rather than Transpose Master. The tight-fitted clothing on this character deformed more uniformly with the body when rigged in Maya. After posing, much of the body required resculpting in areas of major deformation. It was then a case of using a BlendShape and Wrap deformers in Maya to refit the clothing to the resculpted areas

Diana Vishneva (Arabesque)

37. Hair I prefer to sculpt hair – it's one of the most enjoyable parts. I start by extracting the scalp for a base and block in the major forms using the Clay Tubes with Lazy Mouse on. Once happy with the volume, I start tightening them using the Clay Tubes brush at progressively smaller draw sizes.

38. Anatomy and proportion The extreme nature of this pose really tested and pushed my knowledge of anatomy. Without the luxury of a live model and a limited number of relevant photo references I relied heavily on anatomy books such as Eliot Goldfinger's *Human Anatomy For Artists*. Studying books like this is essential if you want to create accurate anatomy.

Keeping proportional distances consistent with such an extreme pose was problematic. I used the Transpose tool with its units calibrated to a head length to measure distances between landmarks and ensure these points of reference remained correct and visually effective after posing.

40. Top ZBrush dos and don'ts

Do gather a lot of references. People tell me that they don't want to use references because they want to do their own thing, but that's a mistake. To do your own thing you first have to understand how anatomy works, or how that tree looks from up close.

Do show an interest in other media such as painting or photography. There is always something interesting to learn from all other kinds of art – inspiration is everywhere.

Do use NoiseMaker. Since it made its debut in ZBrush I can't recommend it enough. Depending on how you use it and with the proper UVs, you can achieve fantastic forms in no time.

Do check your model in different lighting conditions using various renders. A lot of information can be lost if you simply use ZBrush materials because they can hide a lot of mistakes.

Don't start detailing like crazy. It's easy to want a lot of detail but that's not what's going to make a character good. You have to have solid shapes first – details are just the icing on the cake. When I work, 80 per cent of what I do is achieved without going further than two or three subdivisions. Strong foundations are the key to successful modelling in ZBrush.

Don't be too fast. ZRemesher does take care of any bad topology you may have, but hard work and patience still pays off, so pay attention to details.

41. Anatomy Researching your subject is hugely important. If you intend to be a great character artist, you have to study the mechanics and forms of anatomy. Even imagined creatures are in some way anthropomorphic, as they ultimately originate from our personal experience of the world.

42. Posing Even the most skilfully sculpted model will appear inert if not posed. Posing your sculpture can transform it from a cold and lifeless study into something more evocative. SubTool Master can be a quick and easy way to pose a character with multiple elements within ZBrush.

43. Transpose Besides posing and making proportional changes to your model, the Transpose tool can also be used as a measuring device. By calibrating its units in the Preferences to a head length you can quickly draw transpose lines on your character model to check proportional distances between landmarks.

44. Traditional techniques I often look to the traditional world for inspiration as well as reading books on both modern and classical styles of sculpting. This is a great help when it comes to ZBrush, especially for difficult elements such as clothes and hair – it helps you to learn how different parts can then make up a whole.

45. Creating crude shapes The Clay Buildup brush and DynaMesh are two of the best tools you can use to create the initial shape of your concept. When using Alpha01, the Clay Buildup brush can also create some soft muscle details.

46. The Dam Standard brush This is one of my favourite brushes. When used in a smaller size it can create extraordinary detail, while the larger brush size can quickly build the large muscle shapes. You can also use it for hard surface sculpting in ZSub mode, where it can be used to create the effect of jagged rock formations.

47. Environments A good way to design realistic environments is to use PlanarCut with the ZAdd mode on and Alpha28 selected, which can create some outstanding planes. The TrimDynamic brush can then help make any sharp edges. To add further detail to a cliff face, the Slash2 brush can be used to create a weatherworn effect. Remember not to use a lot of Alpha for the smaller details. For an environment, the large forms of the work are always the most important.

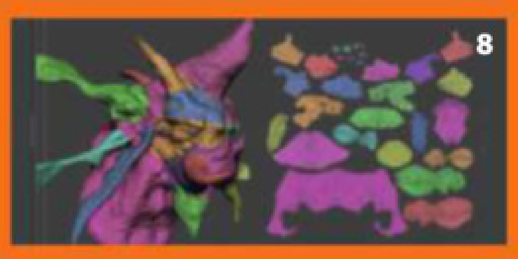
48. The ZBrush library Don't forget that in ZBrush's own brush library there are many useful brushes. Open Lightbox and test them one by one to experiment with the results, such as the scales and interesting noise textures.

49. Sculpting hair The CurveTube and CurveTubeSnap brushes are very useful when sculpting on a DynaMesh. I use them to increase the volume and the effect of an accumulation of hair, just like sculpting in the real world.

Zhelong Xu's ceramic lion is a perfect example of the intricate details that ZBrush is equipped to create

I often look to the traditional world for inspiration, as well as reading books on both modern and classical styles of sculpting. This is a great help when it comes to ZBrush

Zhelong Xu



50. Creating a character

Step 1 Draw a concept for your character in Photoshop and write some descriptive key words to go with it.

Step 2 The first step in ZBrush is to use ZSketch to quickly shape the model and then convert it to Polymesh3D.

Step 3 Activate symmetry and use the Clay Buildup, Dam Standard and TrimDynamic brushes to define characteristics. Rebuild the model with ZRemesher to get a clear base mesh.

Step 4 Start sculpting – you need to build the shape. Don't focus on detail!

Step 5 Use the Move brush to roughly adjust the shape, styling it a bit.

Step 6 Duplicate the model in Tools>SubTools, then with ZRemesher generate the final basemesh with quad-polygons. For my project, I restricted the number of faces to 6,500, so when subdivision is increased to level five the model will have 1.5-millon polygons for finer details.

Step 7 Continue sculpting detail using the Dam Standard, Standard, and Clay Buildup brushes.

Step 8 Export the low-resolution model to unfold3D for UV layouts and then import it back to ZBrush.

Step 9 Finalise the sculpt, adding final touches and accessories.

Step 10 The last step is polypainting using Alphas, then you're done!

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Framestore devised a solution to bake ray-traced light bounces, reducing render times from 500 hours per frame to around 150

FRAMESTORE

BEHIND THE VFX

Creative directors William Bartlett and Murray Butler discuss the secrets of Gravity and winning an Oscar for best achievement in visual effects

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The last time 3D Artist spoke to Framestore, FX supervisor Alexis Wajsbrot revealed that even from day one on *Gravity*'s pre-production, the team had a secret goal. Framestore's ambition stretched beyond the creation of just another impressive visual spectacle, it wanted to *Gravity* to stand as a new standard for visual effects, much in the same way as *The Matrix* or *Avatar*. That's no mean feat. And yet, less than a year following the film's critically appraised release, that goal may already have been achieved.

Alfonso Cuarón's space-based thriller was nominated for no less than ten Academy Awards, winning an impressive seven in March – including one for Best Visual Effects. This came after six Visual Effects Society Awards and a Special Effects BAFTA has already been awarded, cementing *Gravity* as one of the most well-recognised VFX achievements in recent years.

Of course, these accolades were not the first for the studio. In 1995, Framestore accepted its first Oscar for pioneering work in the field of film input scanning, and to date has gone on to win and be nominated for six more. They join a host of others, including its five BAFTAS, five Cannes Lions, 13 Emmys, and 21 Visual Effects Society awards – all this from a company founded by five CG enthusiasts back in 1986.

It was a lot of talent mixed with a little bit of right place, right time, with Framestore starting out when the potential of using computers to make films was just starting to be glimpsed. Ultimately expanding from a team of five to one of 800 spread across four global locations, Framestore is now one of the industry's most impressive successes stories.

We met with creative directors William Bartlett and Murray Butler to find out more about the studio, and to discover what it's like at the top.

The crucial pre-vis for *Gravity*. Thousands of props were individually image-modelled and dressed into the interior sets one-by-one for the final shot

Lighting was determined with the DOP using a mental ray pre-light of the pre-vis, which informed the lighting set-up when on-set

The live action shot was only lit by bounce light from a single source outside the window. Warm and nurturing womb-like lighting was achieved for the final shot

Live action conformed into the 3D scene. Some CG body parts were still required at this stage

Storemags

Framestore was awarded its first Oscar for *The Golden Compass*, a movie that secured the studio's reputation for CG animal work

Framestore facts

* There are 36,000 rings of steel in each guard bears' armour in *The Golden Compass*
* During 12 years of good service in the Noel Street office, Framestore's faithful coffee machine served 288,925 cups – equivalent to 24,077 a year!

AND FOR *GRAVITY*...

* To render the film once on a single computer with one processor, it would've had to have started around the dawn of Egyptian civilisation
* There are more than 30 million computer generated stars in the film's starfield
* There were 2,217 unique computer generated models built – everything from the International Space Station to the Martin the Martian toy
* There were more than two million lights in the standard lightbox configuration
* There were 71,178 lines of Arnold shader code written for the show

Then & now

Integrated advertising creative director William Bartlett started working at Framestore in 1995, a move that can be somewhat attributed to a enigmatic person known only as Harry...

Self-described as having been somewhat of a tortured artist, Bartlett loved art, yet he performed better in scientific subjects throughout his school career. At a time when computer graphics courses practically didn't exist, he had little idea of how he could combine his interests with his strengths.

"I ended up doing mathematics at university simply out of not knowing what else to do. However, I was also quite interested in photography and at that time I thought maybe camera work is the thing for me, so I ended up working as a runner for a motion control studio," remembers Bartlett. "I used to hear people talk about how they were going to do the editing, and these people would say 'we're going to do it with Harry, we've got to do it with Harry'. You couldn't do it any other way – it had to be Harry. I kept thinking to myself, 'wow, this Harry guy, he must really be putting away some cash as he's really in demand'! One day, I had to go and deliver something to the post-production department, so I headed down and asked the other runners where Harry was – I wanted to be introduced to such a legend! They just laughed and opened this door – there was just a room filled with a massive computer. 'That's Harry!' they told me. 'It's not a person, it's a machine called Harry and that's Rob who's actually doing it all with a pen and a tablet'. For the first time I saw this combination of artistic sensibility with technical aptitude, all combined in post-production and in compositing. At that stage I was groping around, trying to find what my career should be. As soon as I saw that, I just knew that was the thing for me."

Bartlett began to study compositing himself as a tape op, then came to Framestore to begin working on *Gulliver's Travels* with Tim Webber (*Gravity* visual effects supervisor) back when he too was a compositor working on commercials. "That was a great grounding for me, as he also had a more technical background in physics, so his approach to work was more similar to mine and obviously learning from him was a terrific start," says Bartlett. Unlike today, early visual effects artists at Framestore would usually have little to no training in what was then an uncharted subject, instead being hired with degrees in everything from English and History to Engineering. They would do their work solely by eye and judgement – often sat with the client right behind them the whole time.

A day at Framestore

"Quite often, a day as a Junior at Framestore used to involve a kind of rockstar Flame operator in a room with a bunch of clients," confirms Murray Butler, who joined Framestore a year later. When he started, a long project would usually take only two weeks, but as the software grew more sophisticated and the work became even more detailed, the time it would take to complete a project ended up being so long that this way of working became unfeasible. Today, clients come in every few days to give feedback during review sessions.

"In a lot of ways this change makes it easier to be a junior artist at Framestore, because you're not having to work with clients so much," says Bartlett. "When I started, you did a job more or less on your own, with the client sat there commenting on everything you did. That's obviously very difficult because no client wants to work with someone who hasn't done a job before, because as a company, it's too risky to put in someone who is untried. Nowadays you work in teams – as a junior artist, it's not the end of the world if you don't manage to do the work you get given. When you were sat in a room full of clients, you had to find a way to do it. You'd sit there all night and you'd have to fix it, whatever it was – and to make things worse, people used to pay much more by the hour then, so you felt responsible that even when going to the toilet you were costing them 100 pounds! Now, when you get stuck, you just get a more senior person to help you. You're able to get more experience without having to be under such pressure."

Even so, there are still some downsides to this shift in workflow. "Conversely, it's harder to get to a point where you're then running the jobs," Bartlett continues. "Before, as soon as you were in the suite you were running the job, whereas now there's more of a hierarchy – especially on films, where there are absolutely colossal hierarchies. It can take a long time to work your way through that no matter how good you are, and it's easy to get stuck in the middle. Commercials give you more opportunities to get to talk directly with directors and to run your own thing, but you still need to convince the company that you're working for that it's not going to be too much of a risk. Every job we do, we want those clients to come back again. You won't put someone junior with them for the sake of the junior person's career unless you know it's going to work out well for the client too."

Over the course of the last 19 years, Bartlett and Butler have worked up through the ranks at Framestore to take very senior positions. While they're no longer pumping out assets on the VFX frontlines, their jobs now demand a far broader perspective, managing the huge workflows and sprawling teams on some of the most visually demanding shows around...

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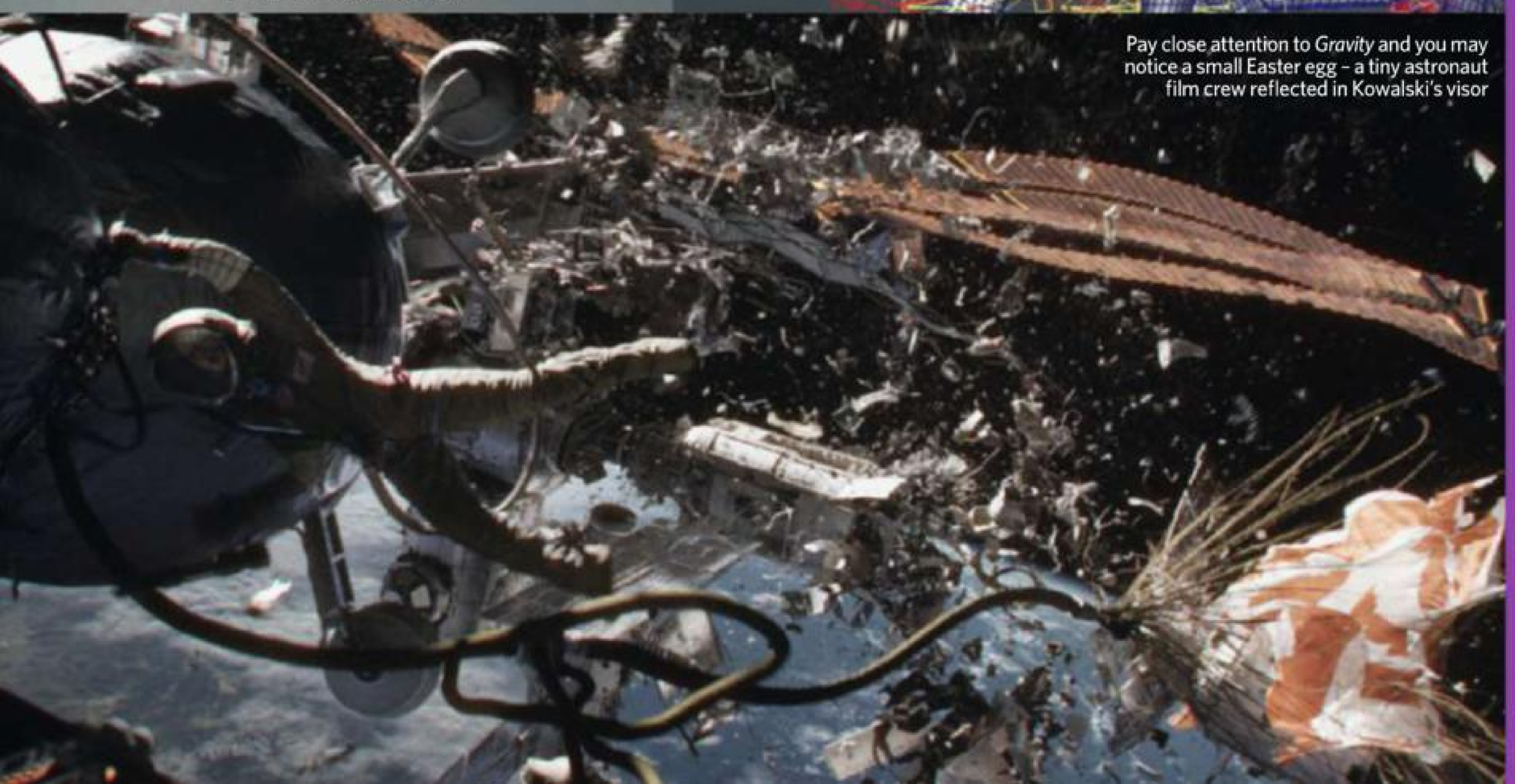
Gravity is far from being Framestore's only technical achievement – it has contributed many innovations across a huge variety of projects

Butler is most proud of Framestore's Qualcomm Snapdragon spots, which received over two and a half million hits on YouTube

Pay close attention to *Gravity* and you may notice a small Easter egg – a tiny astronaut film crew reflected in Kowalski's visor



A brief history of Framestore

1986 Framestore is founded in London

1996 *Gulliver's Travels* first broadcast and Framestore wins an Emmy award

1998 International Monitor award for best 3D animation with Budweiser 'Thirsty World'

1999 *Walking with Dinosaurs* first broadcast and wins a BAFTA Innovation Award, among others

2002 *Harry Potter and the Chamber of Secrets* opens. After having completed just a few small scenes for the first film in the series, a team of 130 worked for nine months on a much bigger slice of the second film, reinforcing the studio's reputation for CG creature work with the film's basilisk and phoenix

2005 Framestore receives a VES Animated Character in a Film award for *Harry Potter and the Prisoner of Azkaban*. Framestore will continue to work on all of the remaining films in the series

2006 Nominated for its first Visual Effects Oscar for the feature-length film, *Superman Returns*

Casino Royale opens in the UK. Framestore creates the title sequence – one of many James Bond sequences the company has produced – and provides the film's full digital mastergrade

2008 Wins an Oscar for Achievement in Visual Effects for the team's work on *The Golden Compass*

The completion of *The Tale of Despereaux* marks the team's first ever feature-length animation

2013 Framestore uses pioneering VFX techniques to bring Audrey Hepburn back to the screen with the Galaxy 'Chauffeur' commercial

2014 Framestore's groundbreaking work on *Gravity* is awarded a BAFTA and an Oscar for incredible achievements in Visual Effects, among a variety of other awards

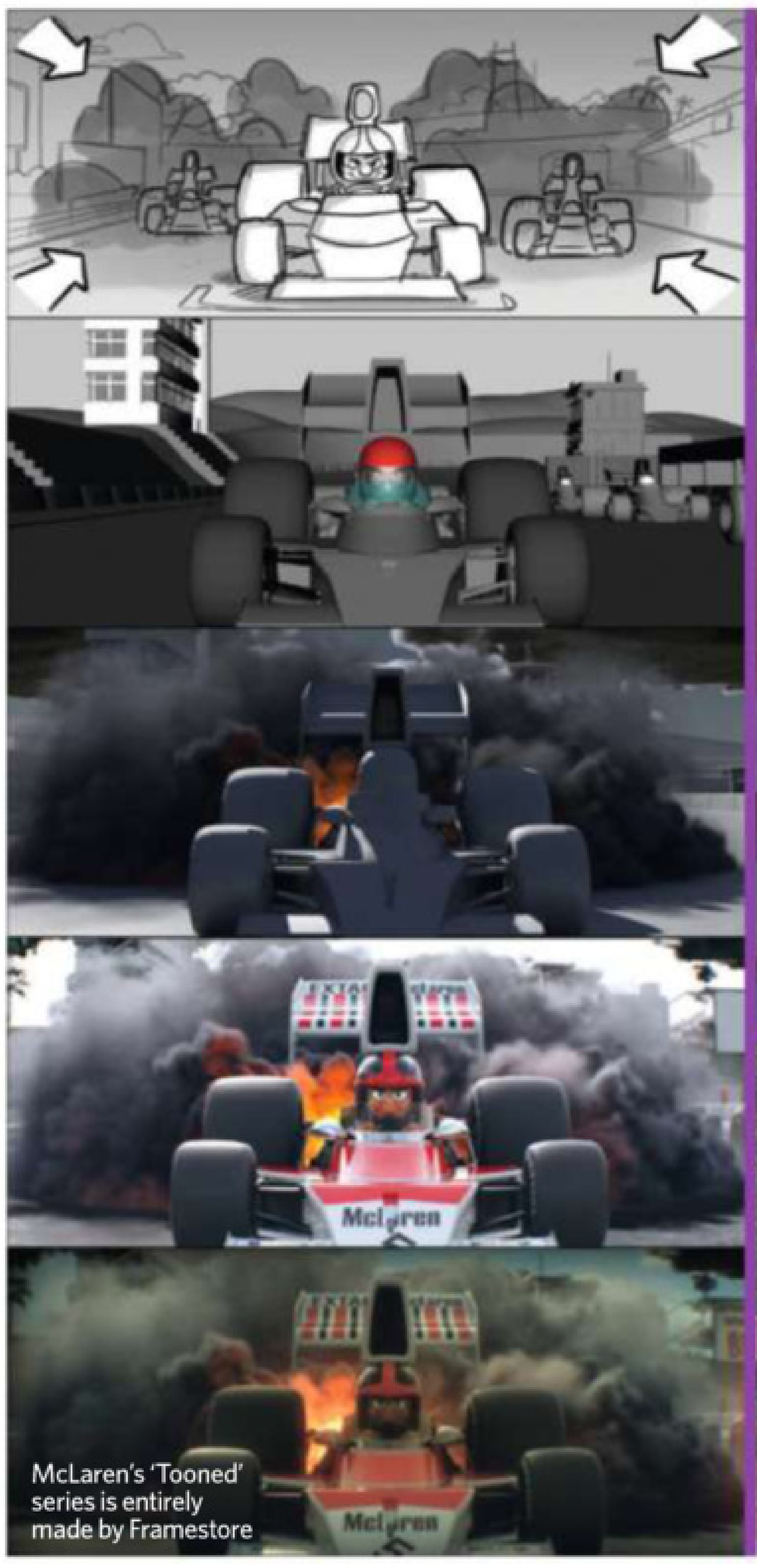
Framestore: behind the VFX

"As a senior, I kind of have two hats, which I think is true for several creative directors," begins Butler. "I have jobs that I either have to be on the shoot for, and then I'll be involved overseeing and supervising those jobs all the way through, or, if I'm directing, it's more like a classic director – I'm sketching out storyboards for an artist, I'm looking at locations and I'm talking about money. It's very different to when I was working as a compositor, because when you are working as a compositor your day is structured!" Aside from these duties, Bartlett, Butler and the whole Framestore team also have reviews every other day, where everyone collaboratively comments upon the work completed so far. Any artist is free to pitch in and make suggestions as to how the project can be improved. Nevertheless, despite the work being done by a group – where twenty different artists with varying creative sensibilities could be working on twenty separate shots – a creative director needs to make sure that the final result is so consistent that it looks like it was all worked on by just one person.

"You can still find great jobs from ten or fifteen years ago, but I think the bar is set really high now," acknowledges Butler. He tells us that even for a studio of as such high-calibre as Framestore, each job that is won is still hard-fought. "There's work that goes in it before you even pitch the job," he explains. "Sometimes I've thought my idea was more in-line with what the clients were asking for, but because another studio has ten more pages of reference material and two more tests, they'll show it to their clients and you've lost the job. Though I've also heard of companies actually going out and shooting mini-tests for particularly lucrative pieces of work and then still not winning – so it's definitely tough out there!

"You don't work until 5pm and then go home in this industry and because of that, it's very important that these jobs in a company fulfil people," Butler continues. "With Framestore, I'd say that generally, the team is made up of a very driven, passionate group of people who really believe in what they do. Over the years, as the budgets for the core business have gone down and gotten cut, you do end up asking people to work longer. There was a time when the margins were a little easier and you could definitely be more relaxed about giving people time off, but we do have to keep the work coming in and it's certainly a harder thing to manage now. There are times, I think, when we've been in real danger of losing that mindset, but that's what we try to do and I know that generally the artists like working here."

It certainly speaks well of the company that even once Butler and Bartlett had been promoted to more senior positions, both struggle to work without getting their hands dirty and never hesitate to start helping the team and jumping onto a workstation whenever possible. "I used to be a pretty successful Flame operator," Butler explains. "You go from knowing you're good at that job and that people like you and you can always wait for the next job to come in, to trying to get involved in other people's jobs and telling them 'hey I'm going to look at your work, but I'm not going to press any buttons here' – it's strange. I still try to do some of my own work on a project whenever I can – at the end of the day, as you get older you realise that is actually the real work in the company. Getting a shot to work or doing the roto – now that's a hard day! You come out of that day and you're tired. However, when you're 25, you can work a 16 or 17 hour day and then just come back after a few more coffees or cigarettes. It's fun, but you have a shelf life. I don't think I could still do that when I'm 60! Either way, to succeed, you need to show a commitment that does go beyond a normal job. If an artist says 'oh well, I need to leave to get my train now', you know that they're not going to be right for the industry. You need a person who says 'screw the train, I really want to nail this'. You really want to see that in someone, that passion."



McLaren's 'Tooned' series is entirely made by Framestore

Everyday life in Framestore

Reinventing the industry

There's no denying that things have changed a lot, not only for Framestore, but for the whole of the VFX industry over the last two decades. However, like the passion, commitment and drive needed to be successful, there are many things that haven't changed at the company. "What's stayed consistent is the way in which the company has grown over the

Winning an Oscar for Gravity

"Of all the projects I've delivered so far, I'm most proud of the work I did on *Gravity*," says head of CG in Montreal, Chris Lawrence. "It was such a huge team effort to achieve – something like 450 people at Framestore worked on it over the three years it was in production. It was a really great team. Apart from being a perfect example of story driven VFX, I think the unique thing about the movie was the depth of collaboration, the director, cinematographer, editor and production designer having all been based at Framestore's office. It was certainly a challenge to figure out just how to make that work, and how to understand what everyone needed to get the job done. Once we did, however, the experience was magical. I truly hope our approach to *Gravity* serves as a lesson for the future on how to make great films."

"Effects are the hardest thing – they're extremely technical, but you also need creativity," says Butler. "Those artists are like rare animals – when you find one, you track them and you keep them in the building"

Murray Butler discusses the recipe for success at Framestore

TENACITY

"It's interesting with young compers. A guy comes up from film and you can tell he'll be fine – he'll say 'no, I want to stay and do it to get this perfect', and for me that is a tenaciousness you definitely need."

SELF-CRITICISM

"You also need the ability to be self-critical about your work. I notice a lot of not-so-great artists will be amazing at critiquing other people's work and then produce something that makes you wonder how they saw that in everybody else's work, but in their own work they think it's fine. That's another thing about the culture at Framestore – you need to be able to have people critique your work and you need to be able to accept it, whatever level you're at. If people get really sensitive about it then they need to adjust their mindset."

FLEXIBILITY

"Another thing is that with some of the younger artists, if you ask them to do something like a matte painting, they tend to get hung up on one idea and they'll be working on it for three days and everything rides on that one picture. You really want to say 'look, do four not-so good pictures' – almost just throw the first one, then do another one, then another and another and only then we'll choose one. If you come in and it's become your baby, that's not the way to work in this industry. You need to be very open to change."

years, which has often been led by individuals who have become successful doing one type of work for the company," begins Bartlett. He explains that over the years, whenever a talented artist developed a passion for a different type of project, Framestore was usually enthusiastic about making it happen, even if it was inconvenient to the company.

This enabled Framestore to expand not just in size, but also in the sheer variety of the projects undertaken, which now range from commercials and feature films to brand ID and design. "When Tim Webber wanted to do long form work with *Gulliver's Travels*, it was a new thing and he sort of said 'I really think we should do this kind of work' and they backed him to do it and it became something that we then did for many years," explains Bartlett. "The same thing happened with me. I did a lot of commercials and then it got to a point where I really wanted to lead the project and wanted the experience of doing a long shoot and being part of the creation of a longer story. I then ended up supervising this drama for the BBC called *The Lost World* – it was a year long, which meant that I stepped away from commercials for a year. At the time I had some quite big, loyal commercial clients and those relationships were then put at risk because I was not available for a year, but because Framestore knew that I really wanted to do it they backed me on it, and it was a good project. It won a few awards and was successful – everyone was very encouraging and supportive throughout. I think you get the best out of people when they're doing things that they are really passionate about. It's good business sense to give them those opportunities so they don't end up with a reason to leave. That philosophy is distinctive with Framestore, and it's something that is the same now as it was twenty years ago."

This understanding approach to the aspirations of artists has also enabled Framestore to easily adapt to some of the industry's more recent developments, such as giving artists the ability to make in-house work with projects like *The Tale of Despereaux* in 2008, marking the team's first ever feature-length animation. Combined with this, Framestore has also been at the helm of the industry-wide push towards client collaboration. "I think more creative collaboration with clients and less service is where we do the best work for ourselves and the best work for our clients," affirms Bartlett. "It's where the clients are the happiest with our work. Just the work we're doing on installations and interactive work is growing – how that all blends in with collaboration and the traditional work is really exciting in terms of the opportunities there are and the different ways we can contribute."

Nevertheless, solo, in-house work remains an important part of Framestore's output. "It is very fulfilling to execute something and feel ownership over it, and because it's our project we really know what the CG guys have to do. We consider what we're shooting and it's a streamlined, efficient process," explains Butler. However, this can cause some of its own problems for the artists. "The funny thing is, when I started directing I thought it would be the most perfect workflow ever, but actually people are so used to working for external companies that there is a bit of a mindset change," laments Butler. "If I've been on your side for five years and suddenly I walk in the room and I'm the director, it confuses people. Quite often when a director asks for something, artists have a moan because they want to change so much, but you can kind of externalise it. However when you're director, people then don't have anywhere to put their angst. It's a different dynamic and it's taken us a few years to get to the point where everybody respects the workflow again and they like it."

The *Gravity* crew. Framestore's groundbreaking work on the film, which was fully made in Britain, has won a host of awards and nominations

The future

"I'm a bit more of a traditional person, but Framestore is branching out into so many other areas of expertise, and I think it's really great to see that prop us up," says Butler. However, the most important element in the Framestore formula – as we're so often reminded when talking to such companies – is not the advancements in filmmaking tech, or improvements in the ever-developing CG software, or even the continued exploration of previously unmapped areas of VFX . Ultimately it's all about the artists.

"I think people forget that the computer doesn't actually know what's wrong or right, but when you have good animators they make it look like it's a simple matter of pressing a few buttons," explains Butler. "When we bring in external artists and animators, that's always when we realise how good our internal team is. The tools will always be changing, that's for sure, but the core skills that we rely on are people that can animate. To be honest, for a lot of jobs, if they overrun, it will be because of the animation – not because the animators aren't doing the work, but because it's just so critical that you can't really budget. If the animation isn't there, everything else falls apart. It's the quality of people's eyes, their animation skills and their inherent creativity that are always going to be at the very core of what it is that we do."

With so many awards and nominations under Framestore's belt, and this year's ground-breaking work on *Gravity* giving the visual effects industry more of the much-needed recognition that it deserves, the human element at Framestore certainly seems to be operating on a very high level indeed. Whether it's creating the latest in-house projects and installations, directing commercials, or inventing new ways of breathing life into film, it's extremely exciting to think about what innovations these talented artists will be working on next. No matter what, though, Butler tells us there is always one guarantee. "It doesn't matter what you bring to us," he concludes. "We're going to find a way to help you, and everyone's going to be passionate about it."

The 10 most Challenging Framestore Projects

1 / BBC *WALKING WITH DINOSAURS* / 2000

We created all the dinosaurs and other creatures for the BBC's flagship natural history programme. It was an exciting project, but it made us very nervous at the same time because of the amount of material we had to generate (nearly two and a half hours of photorealistic CG animation). Despite this, the end result was really eye-catching at the time.

2 / GUINNESS 'NOITULOVE' / 2005

We've done a lot of Guinness ads in the past, including the famous Guinness 'Surfer' ad, but this backwards stroll through time is an extraordinary digital collage of stock footage, custom built CG creatures, CG plant life and scenery, digital stills and effects.

3 / THE *HARRY POTTER* SERIES / 2001-2011

We worked on all of the *Harry Potter* films in some way. Buckbeak in *The Prisoner of Azkaban* was a difficult beast – both fur and feathers, with wings that had to move from fully outstretched to fully folded without interruption. Creating Dobby and Kreacher in *The Deathly Hallows* was also challenging – Dobby in particular had some very important and emotional scenes, so we had to make sure that we absolutely nailed it.

4 / *THE GOLDEN COMPASS* / 2007

The director Chris Weitz made it clear to us early on in the process that they regarded Iorek the armoured bear as a main character, and therefore expected a performance to match that of his human co-stars. The armour added an extra tricky element as it meant fitting one CG element on top of another in a natural and convincing way. The hard work was certainly worth it, as the film won us our first VFX Oscar in 2008.

5 / *WHERE THE WILD THINGS ARE* / 2009

The unique thing about Spike Jonze's take on Maurice Sendak's classic children's book is the way in which the Wild Things were done – they're huge practical suits with animated faces. It's a really subtle blend that's hard to spot and we had Spike come into Framestore to oversee it all and, as he put it, "make sure these creatures lived and had a soul." We even got a video pep-talk from Maurice Sendak, who said "make this the best thing you've ever done – no futzing around!"

6 / COCA-COLA 'POLAR BOWL' / 2012

We provided something a bit different for Coca-Cola's 2012 Super Bowl campaign – interactive CG polar bears that could react to the game and interact with fans in real-time, which, of course, meant real-time rendering – no easy task. It was hugely successful and sparked a ream of real-time projects for us.

7 / MCLAREN 'TOONED' / 2012-PRESENT

The challenging thing about 'Tooned', a cartoon series we make for McLaren, is that we don't just animate it, we write, direct, art direct and produce it too. We will often create a three-minute, full CG episode in just a few weeks.

8 / *SKYFALL* TITLE SEQUENCE / 2012

We're really proud of our fifth Bond title sequence, particularly the CG dragons and the full-3D volumetric environments such as in the heart-to-skull sequence, which was made up of hundreds of veins. Not only was it a difficult task to procedurally animate and simulate all the veins, but the volumetric nature of the shots and the interactive lighting posed a huge rendering challenge.

9 / *GRAVITY* / 2013

This was the film that simply nobody knew how to make. In the end it took more than 400 visual effects artists over three years to create the stunning computer generated visuals in Alonso Cuarón's masterpiece, which makes up about 80 per cent of the film.

10 / SNAPDRAGON 'UNSUNG HERO' / 2014

This is our largest internal advertising production to date. We shot for pretty much nine days straight across 17 locations, using helicopters, Russian arms, cranes – you name it! Back in the studio we had great fun giving the ad's dragon character a makeover so he'd really stand out and letting our imaginations run wild with the huge bronze dragon statue.

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PROFESSIONAL VIDEOGAME DESIGN UNITY 3D

Originating in 2008, Unity 3D has gone from humble beginnings to one of the biggest game development platforms in existence. We sat down with some top Unity experts to break down the engine and shed some light on what advantages it offers artists today

Head to page 76 for our Unity Masterclass

Interviewees

Rob Dodd // Fireproof Games
Damien Rayfield // Fireproof Games
Brent Barrett // Camouflaj
Stephen Hauer // Camouflaj
Ryan Payton // Camouflaj
Lasse Middelbo Outzen // Press Play

An overview of Unity

There are a myriad of engines out there upon which to build games, yet Unity is quickly becoming the go-to choice for developers looking to make quality titles without breaking the bank. With an install-base of over 139 million users, it's safe to say that the Unity 3D engine and its browser plug-in have taken the gaming scene by storm. The engine even comes with a marketplace through which developers can sell their assets to one another, creating a strong and vibrant community that cross-develops for iOS, Android, PC, PlayStation, Xbox and Nintendo Wii.

So why has the software seen such tremendous growth since its inception back in 2008? Because it understands exactly what development teams need out of their tools and gives it to them. "[We chose to use Unity] because of its ease of use and cost," begins Rob Dodd, technical lead at Fireproof Games. "When we first started developing, there were only two of us making the game – one coder and one artist – so we needed something that made sense for a team of that size. Unity makes it very easy for a single person to get a lot done, so that was a big factor."

"Unity's versatility and accessibility makes it easy to approach and work with," adds Lasse Middelbo Outzen, lead artist at Press Play, a studio that recently released *Max: The Curse Of Brotherhood*. "The free version and the ability to quickly prototype ideas have definitely helped a lot of people get started with games development," he explains, highlighting that much of the indie games revolution is thanks to Unity and its open approach to licensing and pricing.

However, the perception of Unity as a tool that solely caters to smaller teams or independent developers is slowly fading. Unity has consistently grown since its launch, adding numerous new features and expanding significantly in size. The company also recently signed contracts with both Microsoft and Sony, meaning we're going to see many more Unity-created games on the next-gen Xbox One and the PlayStation 4 consoles.

"Previously there has been the impression that Unity was only a good tool for small or simple projects," Camouflaj's content designer Brent Barrett tells us, "but more than a few games built and released in the past two years have overthrown that notion entirely. Even developers using other tools for their day-job will have Unity installed on their computer at home. To put it simply, it's the way of the future."

Professional videogame design

How does Unity benefit the 3D artist?

Unity is one of the few engines out there that has been specifically built to enable developers to make games and assets that can be supported across a variety of platforms. From the high-end, triple-A, next-generation console titles to smaller – but nevertheless just as impressive – iOS releases, the engine can cater for everyone. It's an important feature in a world of second screens and cross-platform interactivity.

"Unity is extremely easy to use – almost too easy, I fear," states Stephen Hauer, art director at Camouflaj. "I worked at Microsoft for many years and you become numb to the fact most of the engines or proprietary software will be clunky, not well documented and just painful to use. For an artist working in Unity, all you need to know is how to export an FBX from your modelling package, how to author a TIF file and whether you can drag and drop them into a project. Unity does the rest for you, or can be programmed to do so."

Thanks to Unity's workflow, an artist can stack up multiple features, which makes it easier for the user to create high-end effects with minimal complication. After you've spent some time in the engine, you'll find you start to learn what your favourite effects are and build up a catalogue of the most-used layers, creating your own visual languages and themes without ever having to mess around with external shaders or lighting engines – absolutely everything can be achieved to a very high standard within Unity itself.

"When I came on board, I had some simple Unity import tools created that allowed an artist to create a model and, provided they used correct naming conventions, Unity would then associate all the materials to the model immediately – no setup or material association needed," continues Hauer. "I have never worked with another engine that allows for this kind of workflow. There is little to no management needed by the artist. If you stick to a specific naming convention, then Unity will find those relationships and associate the rest. As long as you have those few key people on your staff who are forever unsatisfied with the mundane and are always seeking a better way of doing things, then you are well on your way." For Hauer, Unity massively streamlined his creative process, superseding even Microsoft's in-house engines and allowing his job as an artist to be exactly that – an artist. No mess, no fuss.

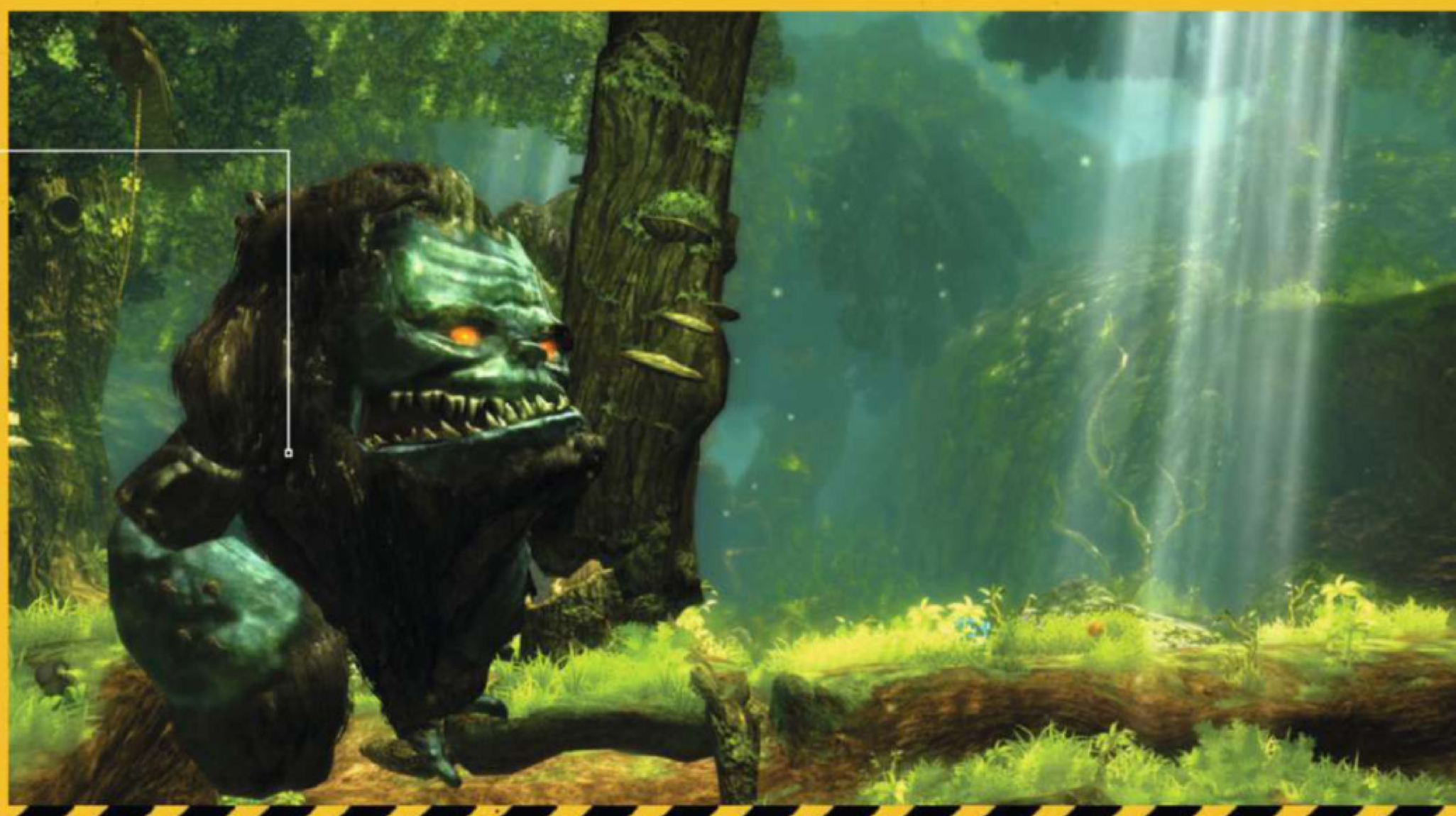
Unity for beginners

For designers or artists with little prior knowledge of videogames, Unity offers a streamlined and accessible entry point – the UI is simple and user-friendly and the core functionality is intuitive. Unity also ships with a plethora of tutorials and videos, and the bustling community constantly uploads cheat sheets, tips and shortcuts, which offers new users the opportunity to fully take advantage of the software.

"The surprising thing about Unity is that it absolutely performs as a work tool," Camouflaj's Barrett tells us. "Prior to Unity, mods of existing games were the only real way for underfunded or amateur teams to create something they could expect to sell. Now, Unity's scalability and flexibility, multiplied by the Unity Asset Store, are the tool's formulas for success. With the Asset Store, Unity has created a market out of game developers, which results in users being supported far beyond the ability of any single tools team."

For designers or artists working on a tight budget or deadline, The Unity Asset Store is an adaptive and practical resource. It offers fairly priced meshes, animations, textures, rigs and a whole host of other materials that enable a wide range of ideas and concepts to be achieved without the need for any original content to be developed whatsoever. "Unity's great for being able to mock-up ideas to try things out and experiment with, too," Damien Rayfield, director at Fireproof tells us. "You're always safe in the knowledge that you can just revert any changes you don't want back to prefab, if needed." This is handy for amateur artists that want to experiment with their designs – if they push a concept too far, there's no difficulty in snapping straight back to square one. The speed and ease of doing this prevents blocks on the working process, which can be hugely beneficial when trying to maintain creative momentum.

Since the Unity engine is proprietary, there are situations where an artist or designer can come up against a wall – a limit within the engine that isn't found in other, non-licensed software. However, "Unity is great at anticipating where people are likely to want to push things and providing ways of doing it," explains Dodd. "In the few places we've come up against limits, we've generally found a way to code around the problem. Being able to write custom plug-ins is very useful in those situations." That's another bonus new users can take advantage of in the software – if they're trying to do something that doesn't seem possible, the scripting tools in Unity allow for fast iteration and execution of new workarounds, making almost anything possible.



BEST FEATURE FOR ARTISTS?

// Lasse Middelbo Outzen discusses how projects started in other software can be fine-tuned in Unity

"Some of my favourite models in *Max: The Curse Of Brotherhood* are the background statues used throughout. They are big and mysterious, but also funny, and I think they expand on the universe without making too much noise or getting in the way. They were sculpted in 3ds Max and refined and Normal mapped in ZBrush. Once imported into Unity, a Custom Shader gave them a layer of dirt and moss covering the up-facing surfaces"

INTERACTIVE OBJECTS

// "The camera found in the séance scene of *The Room Two* is one of our favourite models," explains Rayfield, Fireproof's director. "It's a great contained piece with lots of detail and interactions."

"For example if you take a picture without the bulb present then sparks and particles emit from the socket. The eye lens at the rear actually projects a real-time image of what the camera is viewing and the focus can be altered. The expandable bellows also animate when the crank handle is moved. It's a wonderfully interactive quirk in the game"

TAKING ADVANTAGE OF THE PLATFORM

"*République* is a very hardware-intensive game," Camouflaj's Barrett tells us, "and the atrium (pictured) pushed our iPads and iPhones harder than any other area of the game"

Additive-blended cards
"We used additive-blended cards to mimic volumetric light shafts for the light rays coming from the skylight. This, coupled with a simple Dust Particle emitter, brought the atmosphere of the atrium to the next level"

Commanding attention
"Your attention is first drawn to the beautiful sculptures towering above the lobby. They are highly optimised meshes and utilise a custom BRDF shader authored specifically for the statues found in this scene"

Keeping it current
"The cloth banners hanging from the ceiling use a Vertex-animated Wind shader that mimics the flutter of air currents, the extent of which is controlled by the Vertex Alpha value. This subtle effect really helped sell the atmosphere of the atrium"

Real-time reflections
"Perhaps the most technically impressive effect in this scene are the real-time reflections on the floor. These were accomplished by generating a Cubemap from within Unity that is then Parallax corrected based on the viewing angle and position of the camera within the reflection volume"

Professional videogame design

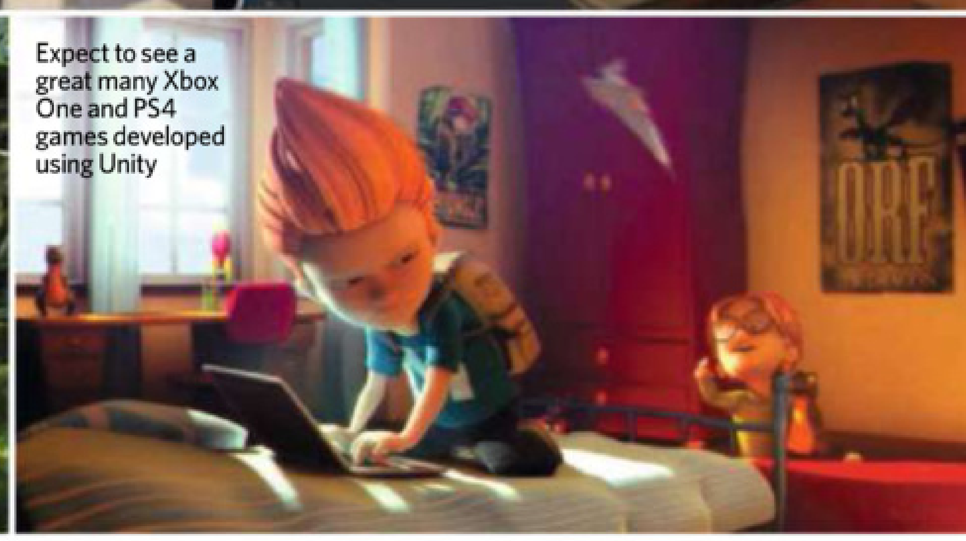
2012's 'The Butterfly Effect' showcased how graphically powerful a tool Unity could be

BEST FEATURE FOR ARTISTS?

// Camouflaj artist, Jeremy Romanowski, gives us an insight into how Unity's lighting engine influences his workflow

"If I had to pick one feature, it would be the lightmapper packaged with Unity. This is powered by the fantastic Beast lighting engine – I don't think I've ever felt as empowered as an artist as I do while lighting a scene in Unity. Lightning-fast iteration, fantastic GI and AO results, directional lightmaps, localised lightmap resolution and automatic lightmap UV unwrapping (although we prefer to pack our own UVs) all come together to provide the artist with unparalleled influence over colour, contrast and mood."

The free version of Unity can be downloaded at **unity3d.com**



Expect to see a great many Xbox One and PS4 games developed using Unity

What's next for Unity?

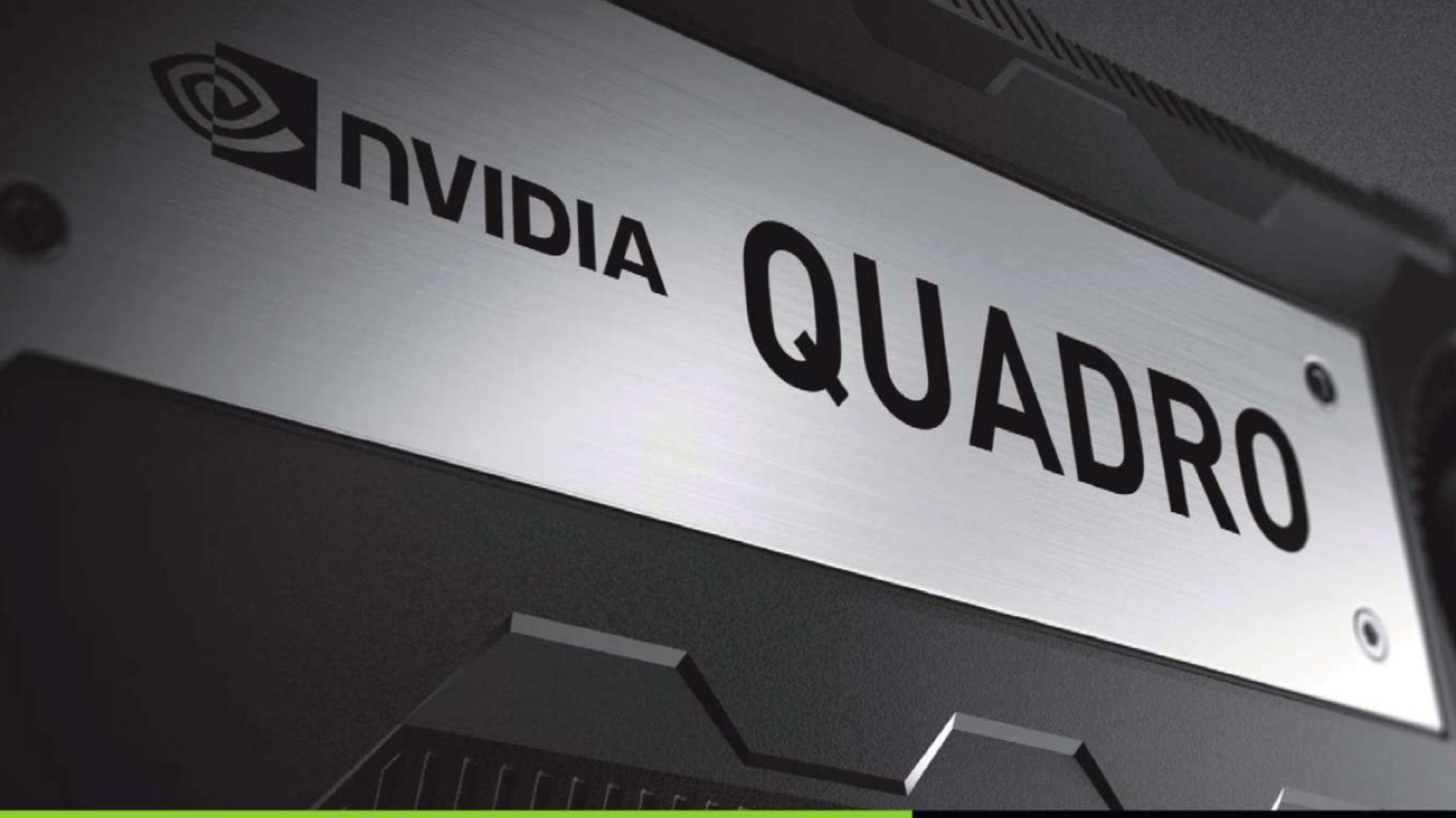
As Unity continues to grow, the main goal will be to keep things simple, enabling even the layman to create imaginative and intricate gaming experiences. "The natural progression will be to support new platforms and add new features, but this comes with the concern that Unity might spread itself too thin," says Rayfield. "We've seen it numerous times, when a once accessible piece of software becomes too bloated, complex and unreliable. Here's hoping that Unity can innovate and still keep the core simplicity it started out with."

With the Microsoft and Sony console deals being formally in place and Unity having expanded its remit to the next generation, new features are sure to come. However, this also means that the game development tool will no longer just offer independent developers and artists a cheap and accessible foot in the door, but also a real, tangible pathway to blockbuster success through top-quality console games. "Independent and amateur developers now have a tool that should satisfy most desires," Barrett tells us, "so it's possible that, going forward, Unity will increase its focus on supporting professional developers via continued performance optimisations and improved features for handling much larger and more complex projects."

The ideal paradigm would be that as more professional developers start taking advantage of Unity, more professionally designed art will then in turn become available on the Asset Store. While some may see this as a path towards diluting creativity amongst 3D games art, we like to think – optimistically – that pre-existing models will be taken by amateur designers and built upon, allowing the budding artist more time to hone their craft and realise their ideas without having to spend time fleshing out their models from the ground up. This could in turn result in a greater variety of ideas, more quickly and easily realised than ever before by a far more diverse user base.

"Unity has absolutely democratised game development," says Ryan Payton, Camouflaj's studio head. "The independent game revolution was primarily fuelled by Apple's approach to the App Store and also the widespread proliferation of Unity. Five years ago it was very difficult for teams to get off the ground and have an audience without millions of dollars in the bank, but now we see hundreds of indie games released per week."

Thanks to Unity and the risk-free vessel it offers artists to showcase their work, game design is slowly becoming something everyone can enjoy. "Long-term the games industry needs more new ideas to thrive, and as AAA budgets bloat and publishers become more risk averse, it's smaller teams that are doing the creative heavy-lifting needed to nourish the market," concludes Rayfield. "Tools like Unity are right at the front lines of making this possible for people all over the world."



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“Three textures were used in total – paint, dirt and scratches. These were applied by applying a Blend material on the plane. The material that I made meant that the dirt was on top and that the corrosion underneath could be seen”

Pfalz D III 2014

I really like WWI aeroplanes, so I decided to create one. The modelling was completed in Maya, unwrapping in Unfold3D, texturing in MARI and rendering in V-Ray. It's very highly detailed, with the textures at 16K for the aeroplane's body and wings, 8K for the cockpit and 4K for the machine guns and engine. The aeroplane is a Pfalz D.III with a Mercedes D.III engine on board and two Spandau machine guns. The paint scheme belongs to Joseph Lautenschlager, a pilot from Jasta 11.

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I made this...

Incredible 3D artists take us behind their artwork

Artist info

Alexandr Novitskiy

3DArtistonline

Username: tigersfather

Website http://tinyurl.com/3DAAlexandrNovitskiy

Country Ukraine

Software used Maya, 3ds Max, V-Ray, Unfold3D, MARI, Photoshop

“Everything was created in high detail for smoothness and definition. I textured the aeroplane using MARI and rendered it using V-Ray 3.0”

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Benjamin Erdt

Personal portfolio site
www.ben-erdt.de

Country Netherlands

Software used Maya, Modo, ZBrush, MARI, Photoshop

Expertise Character and creature artist, utilising a range of techniques and styles

Master the art of creature creation

Terrorfish – Leviathan 2014

> The idea behind this project was to create a highly complex and detailed sea creature, from concept to model and final render

Benjamin Erdt is a professional 3D artist, currently living in Amsterdam and working at Guerrilla Games

This sea monster was created so I could practise creature modelling and texturing at a large scale. The following tutorial will guide you through the processes I learned, from inspiration through to final render. By the end of this tutorial you should have developed an understanding of how Maya, ZBrush, MODO, MARI and Photoshop can be used to tackle such a project.

The Leviathan was a very complex task in terms of modelling, texturing and composition. The following steps will demonstrate how the model can be built, textured and rendered. Furthermore, we will take a closer look at how such a huge and daunting task can be approached and executed efficiently.

This project helped me to gain a great deal of experience in the creature modelling and texturing field. Hopefully by exploring the process of creating the Leviathan, you'll see how this workflow can benefit your own projects.

With the Disc

Tutorial files:
- Tutorial screenshots

Learn how to

- Develop a creature concept from inspiration and reference images
- Model the monster's head
- Block out the body
- Organise a large and complex model
- Keep details and colours consistent across a wide variety of objects
- Create Bump map layers using MARI

Concept

We've only explored a relatively small part of the sea, so I can only imagine what else might live down there. Due to my fascination with sea-life – especially deep-sea creatures – and inspired by monster myths, I wanted to create my own interpretation of a Leviathan beast.

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Inspiration and research

Develop your ideas and gather reference

01 Set your goals For this project I conceived the Leviathan as an enormous creature living in the ocean. To get a sense of the scale, I imagined that an aircraft carrier would be a little toy compared to its size. The song lyrics of a well-known pirate metal band describe the hunt for a Leviathan as well as the fight, which were the initial sparks of inspiration to design and create the beast in 3D. We want to make a creature that is a hybrid between several aquatic animals with an emphasis on deep-sea fishes. Gather reference images – for this project, I went for images of viperfish, anglerfish, squid, sea snakes, whales and prehistoric sea creatures as well as reading articles about recently discovered species. When gathering animal reference images it's worth visiting sites such as **www.thefeaturedcreature.com**. Along with a large database, it is updated weekly with images and scientific information about bizarre, beautiful and recently discovered species of the animal world. Compile your image references and print them out so you don't have to repeatedly load them up while working.

02 Start designing It's the head that will define the whole character, so let's start working on this first. To make our beast look more aggressive, double his lower jaw into an inner and an outer one. We can also add four individually sized eyes on each side. Based on the anglerfish, we want to give him fluorescent tips that illuminate his face. This will help to draw the viewer's eye to the creature's head in the final image. To support the transformation from a rather humanoid upper chest into a whale-like design, let the limbs morph into fins as they go down the body. In order to add more continuity and consistency to the overall design, make the tips of the large back fins elongate until they become long tentacles.

Keep it simple

When learning how to sculpt or draw a skull, a general idea is to break it down into simple planes and primitive shapes. It's worth referring to Eliot Goldfinger's *Human Anatomy for Artists* to look for examples of this. Tweaking the proportions and silhouette of the design is also an easier task when dealing with simpler shapes. Applying this process to your designs is important to make even the most bizarre-looking creatures easy to read and acceptable to the human eye. The ways that I check design readability are by squinting my eyes and blurring the image, or having a copy of the viewport window that shows the model from a greater distance.

03 Work on overall shape When combining your varied sea creature reference elements into an overall form, make sure that the Leviathan looks convincing for life in its habitat. When straightening the body from tip to tail, the overall shape still has to be dynamic and functional for proper swimming. Check the image for step 3 supplied with the disc – it shows the straight body from a top view and compares the detailed body with a blurred version. You can see that even with its enormous size and complexity, the shapes of the creature can be broken down into a simple fish. This is important for readability and therefore a believable design.

Artist showcase

Benjamin Erdt

I'm a professional character artist working at Guerrilla Games in Amsterdam with a focus on next-gen game characters. I have been fascinated by science fiction universes and fantasy movie creatures since I was a child, so I trained myself in CG art so that I could make my own. Here are two other projects that I have invested a lot of time in recently.

Saric / Killzone: Shadow Fall **Maya, ZBrush, MODO, Photoshop (2013)**
For *Killzone: Shadow Fall* I worked on Saric's head, creating the high-poly, game mesh and textures.

Monster Concept **Maya, ZBrush, Photoshop (2013)**
One of the monsters that managed to make it from my sketchbook into a final 3D render.

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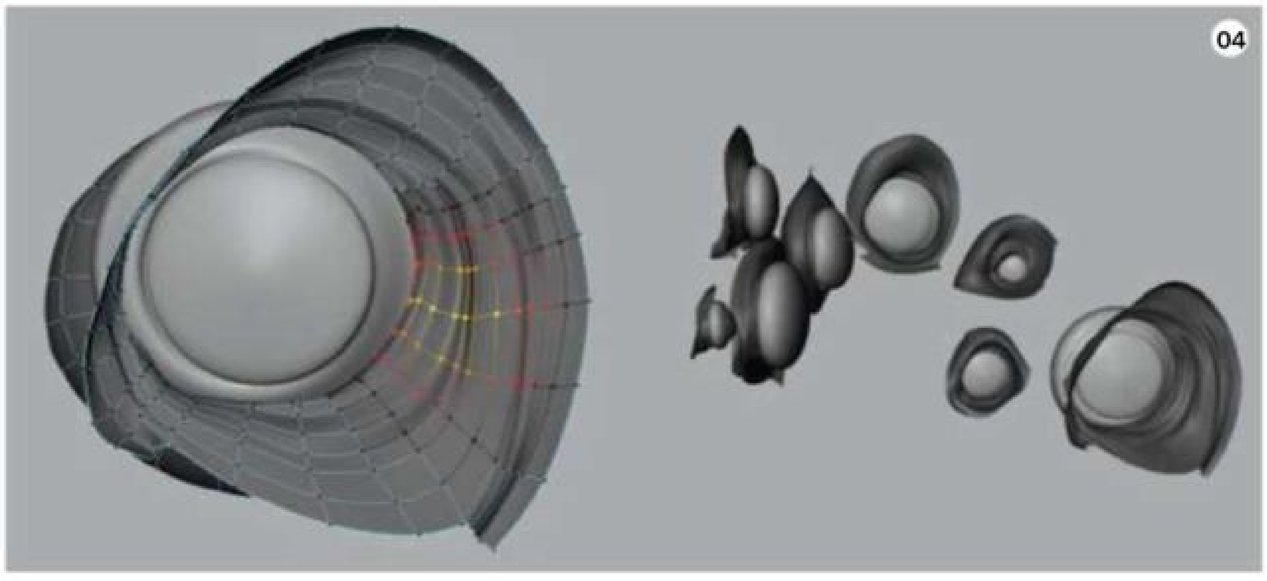
Model the creature

Start building the beast's head and model the body shape

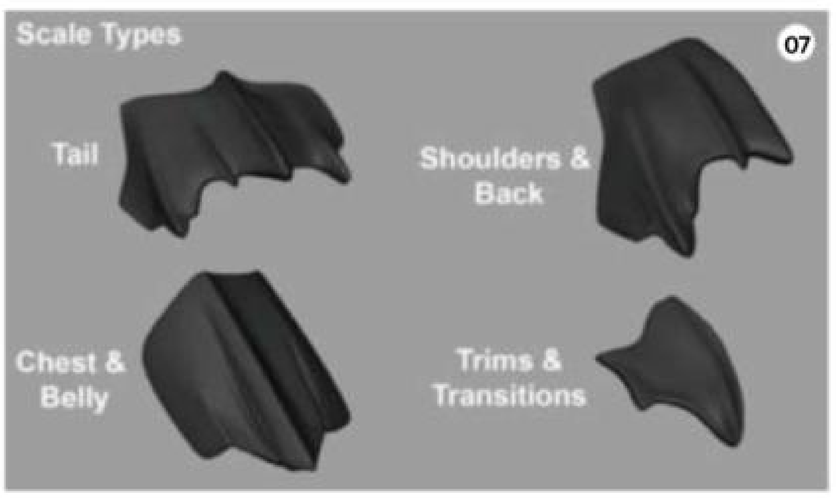


04 Model the eyes Most of my creature projects start with the head, as it is the most important part of the figure. The best place to start is with the eyes. My reference for the look of the eyes was the prehistoric fish known as Xiphactinus. Using Maya, create a PolySphere for the fish eye, flatten it a bit and start building the eye socket around it with standard polygon modelling techniques. Starting with a single polygon, work your way around the eye by extruding edges, adding edge loops, cutting faces as well as pulling and pushing components into shape. Repeat this process for each of the eyes. Keeping the eye sockets separate will make it easier to tweak their relative positions.

05 Develop the head The head is obviously very complex, so we need to spend a good deal of time tweaking to make it accurate. We should start by blocking out the parts that contribute the most to the overall shapes and silhouette. In this case these are the eyes, the glowing antennas, the placeholders where the scales will be, the tentacles surrounding the head, the teeth, the jaw lines and the basic layering of the skin around the cheeks. Keeping these parts separate makes it easier to adjust the silhouette. Once we're happy with the silhouette and shapes, fill in the spaces in between and stitch the parts together.

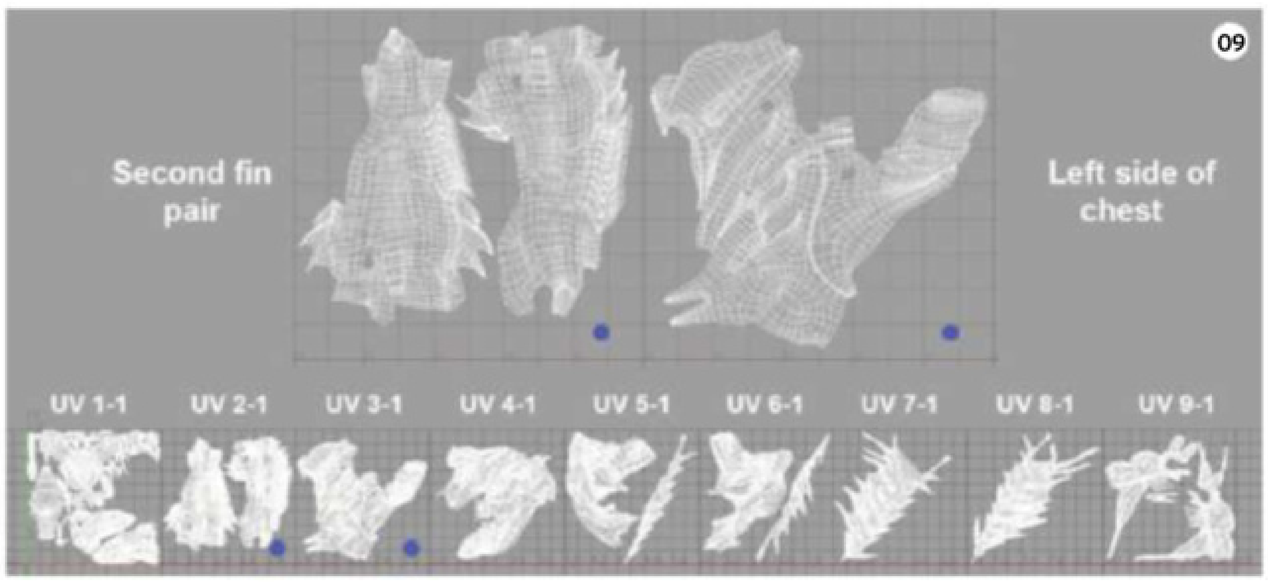
06 Create the body and limbs The body is created in much the same way as the head by modelling very rough representations of the features. Lay down the basic foundation for shapes, silhouette and volume. Once the correct proportions are established, continue adding more definition and detail. From time to time we should take a break from working so that we can look at it with fresh eyes when we come back. This helps to spot any proportional issues.

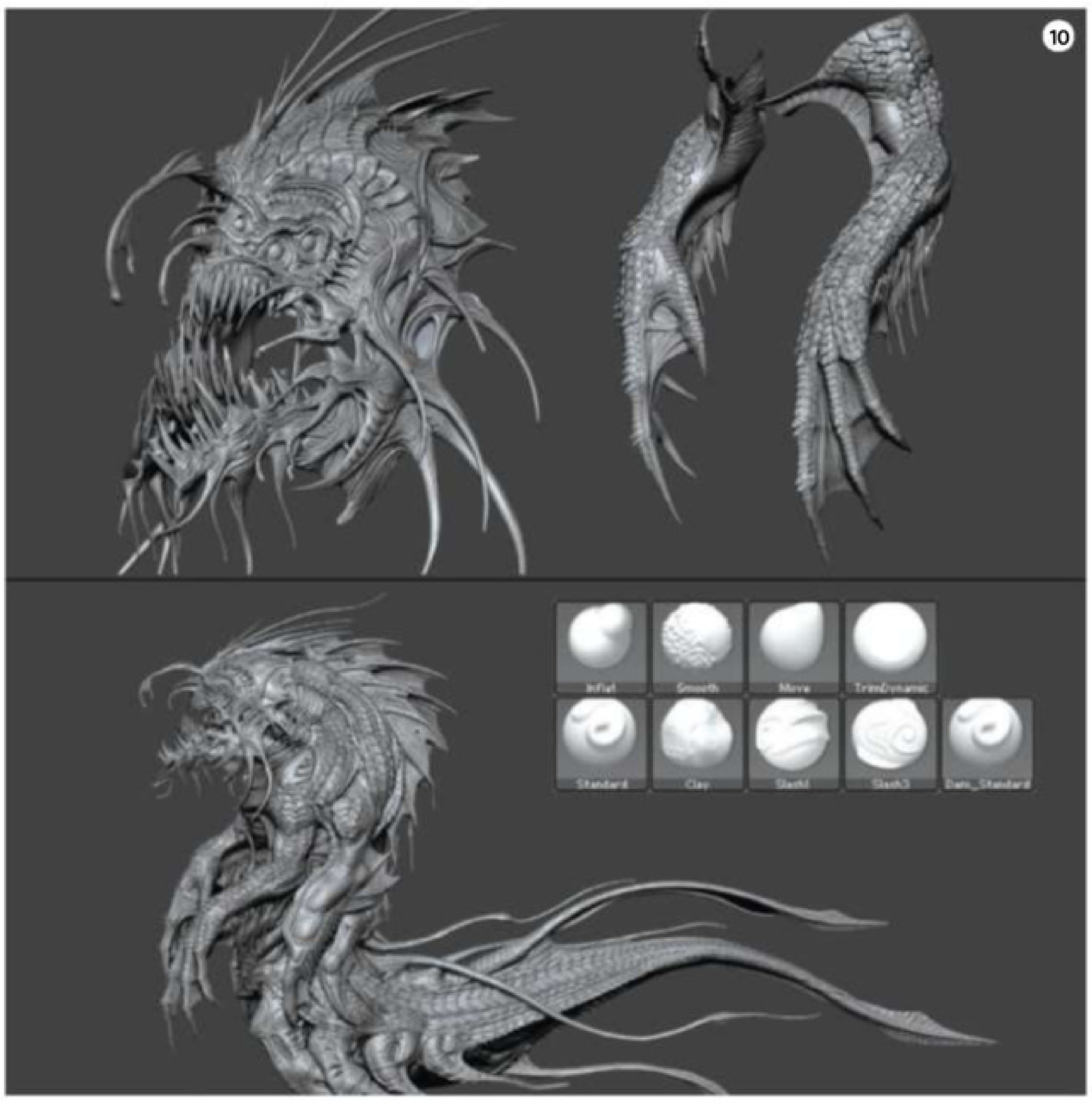
07 Add scales Most of the scales are separate objects and are not modelled into the body geometry. By approaching the scales this way, we can give them individual UVs and therefore greater texture resolution and detail. Four different types of scales should be created as a starting point – bigger plate-like scales to go along the tail, medium-sized scales for the back and shoulder area, U-shaped scales going from the chest down to the belly and smaller scales to be used as trims to create a transition to the skin. All of these different scale types should be copied, transformed and tweaked by hand across the body. This is a very time-consuming process, but it will give you the cleanest and best results for both the design and articulation.



Tidy up the scene

Clean up the scene and import into MODO to create UVs





08 Clean up After the modelling is complete, clean up the scene to prepare it for creating UVs. This includes deleting the history of all objects, snapping their pivot to the world space centre, freezing transforms, checking for flipped normals and deleting unused nodes and empty groups. Naming all objects properly helps to maintain the overview of the model. Proper naming can also reduce issues with scripts that need to iterate through your outliner. After the clean-up process, the entire creature model is organised and ready for export into MODO. The same hierarchy in our outliner is going to be the folder structure for the OBJ files. Each OBJ file has the same name it has in Maya to make it easier to rebuild the outliner hierarchy inside the MODO item list.

09 Unwrap in MODO Before creating UVs, think about where we want the texture seams to be and which objects are going to share the same UV space. In my project, I decided to go for a maximum of 4096x4096 texture maps as they have enough density for the targeted render resolution. Larger texture maps would lead to longer loading times and slowdowns while painting. The torso is the largest object and therefore it needs to be split into nine individual UV patches. The scales are packed together with eight to 20 scales in each group, depending on their size. Here a texture resolution of 2048x2048 per group is enough to reach the desired detail level. Once unwrapped and imported back into Maya, the Leviathan model is ready for the next step.

10 Sculpt finer details Use ZBrush to sculpt surface details. Each OBJ of the creature model will be imported as a separate SubTool into ZBrush. For objects like the torso, which has multiple UV patches, use the UV Groups option in the Polygroups palette to assign a Polygroup to the parts of the mesh that share the same UV patch. This is going to be important for baking Displacement maps. In this project, the brushes that I frequently used for the model were the Standard brush, Clay brush, the Slash brushes, Dam Standard and Inflate. To keep the sculpted details consistent, stick with one type of detail and finish it on all parts of the model before introducing new detail patterns. In areas where the pre-modelled scales needed to blend smoothly with the underlying skin, sculpt in scales to create the desired transition.

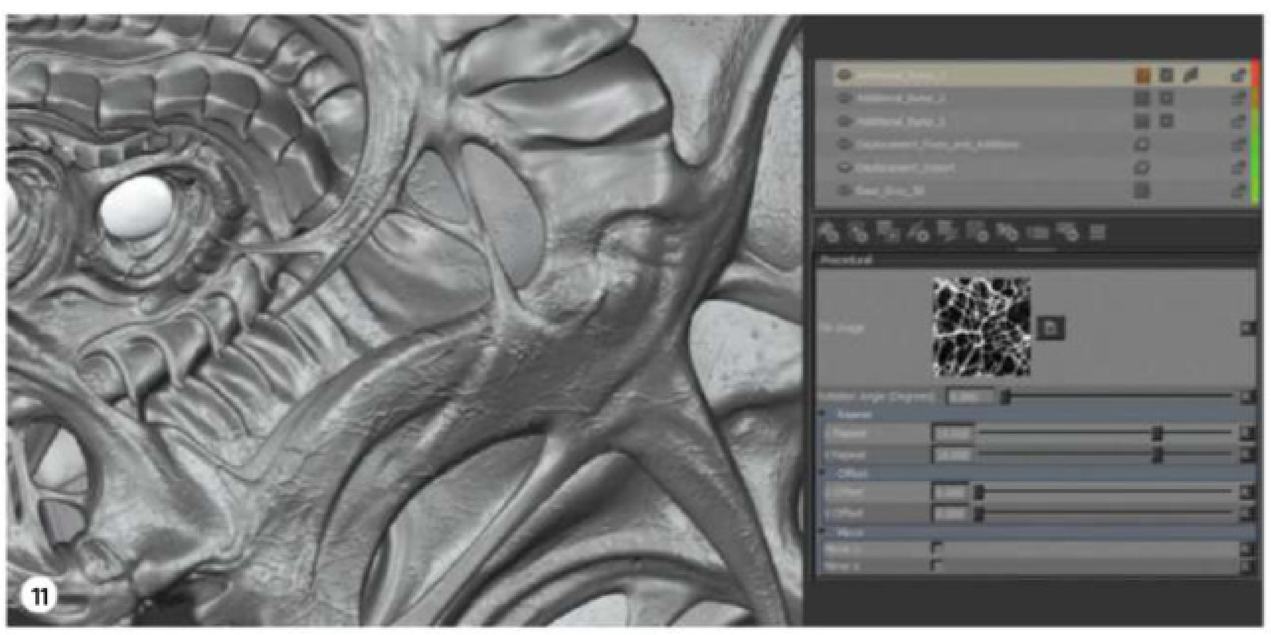
Stay organised, stay clean

When working on a large project like the Leviathan, think about what could be done in advance to stay organised and efficient in the later stages. Before creating any polygons, start thinking about the targeted geometry resolution, which pieces are going to be separate, which parts are visually more important for the later render and which need extra attention. During the modelling process we'll be working towards these specifications. Having a proper naming convention is helpful to maintain the overview of the scene as well as the project folder and to quickly track down objects that could cause errors. It also makes it easier to transfer objects between applications and ensures a smooth texturing workflow for the 100+ parts that the creature model is built out of.

Texture painting

Use maps and layers to texture the Leviathan

11 Create additional Bump maps The Displacement maps provide the necessary detail pattern and density when looking at the model from a distance. To visually support the huge size of the creature with an appropriate detail hierarchy, it's worth adding a Fine Detail layer on top using additional Bump maps. When zooming in closer to the creature's body, the Bump maps reveal the little details like pores, barnacles, wrinkles and other patterns. First, create a set of tiled grey scale maps using Photoshop. In MARI 2.5, the Tiled Procedural layer should be used to spread the maps across the model. By painting on the layer mask we can control the strength and visibility of the details. This process was used to create five different types of skin detail, which were then combined together into one Bump map.

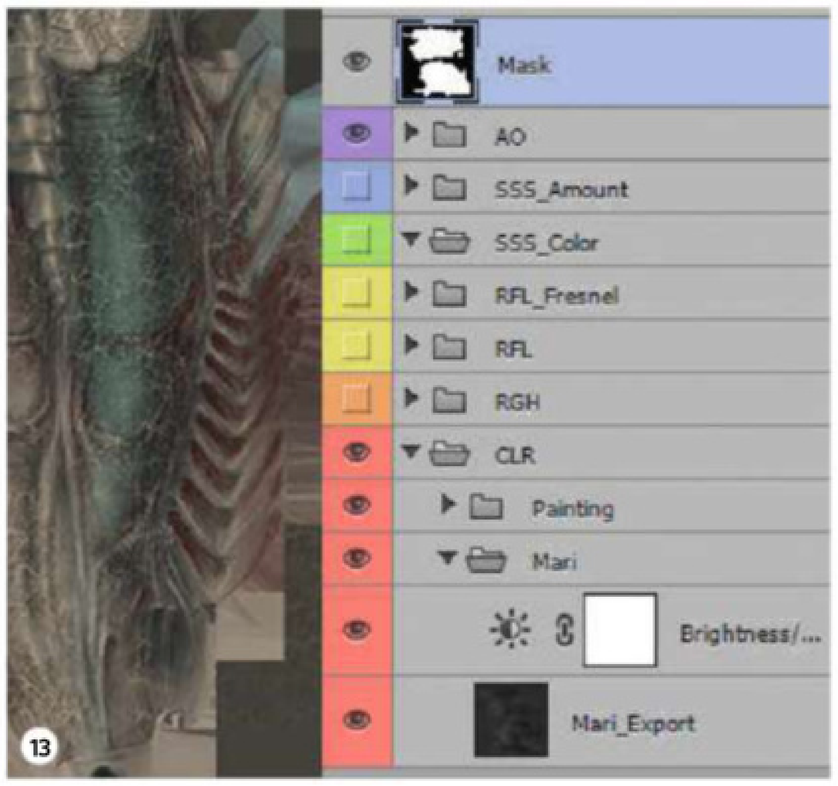


Cavity maps

In order to have a guide while texture painting and so that you can bring some detail back into the individual textures, create a Fine Cavity map in ZBrush. The method that I use is quite old but still very effective. Choose the stock ZBrush MatCap SketchShade4 and import the particular Displacement map as an Alpha. By using the Crop and Fill Function (Alpha>Transfer> CropAndFill), ZBrush will generate a flat map based on the height information of the Displacement map and the MatCap. This method tends to work best if the Displacement map is configured to have around 50% grey as no displacement.

12 Block out colour After importing the creature into MARI and setting up all shaders and layer stacks, begin roughly blocking out the basic colours for the creature. As the beginning of this texturing process is very experimental, don't use more than three different colours. The goal is to find a fitting colour scheme, pattern and hierarchy. Instead of painting on empty layers, use colour constants with masks, which will enable you to edit colours and patterns separately. Along with MARI's masking and adjustment stacks, the colour blocking process will become very flexible and less destructive. Once satisfied with the basic layers, move on to the next level of detail. We'll work with the tones of the existing colours and use a variety of organic brushes and MARI's procedural layers to add more variation to the skin and to blend between different colours and patterns.

13 Take it into Photoshop For final texture edits and creating maps like Roughness, Reflection, Normal/Bump and SSS layers, set up a PSD work file for each piece of the creature model. The image to the right shows the Photoshop hierarchy of one of the arm textures. The MARI pass is the base, while all additional texture edits are added on top in a group called Painting. Use the previously generated Bump maps as masks for more texture detail and to make them pop out more in the final render. To bring back details of the high-res sculpt, we will generate a Fine Cavity map in ZBrush and blend it very lightly on top of the Diffuse.



Final rendering

Pose and render the final composition

14 Pose the creature We'll now create a low-resolution representation of the model to be used as a rig mesh and as a driver of the high-resolution geometry. This will make posing a lot faster as we won't have to deform a multimillion polygon model. After posing the low-res mesh, switch to the high-res geometry to see the results. The rig consists of a simple FK driven joint hierarchy, which is sufficient enough to pose the Leviathan for the render scene. Once happy with the pose, export all objects into MODO using a Batch Export script. In MODO, polish the pose by fixing deformation issues and distortions caused by the skin weights of the rig. For this task, MODO's Sculpting tools will come in handy.

15 Set the scene in MODO The model consists of 100 parts. Each has its own material, which is named after the object it's assigned to. This helps to control the overview of the large Shader Tree. Before loading in any Diffuse, Roughness, Reflection or other maps, do some test renders to check the Displacement and Bump maps. Regions with UV seams need extra attention as they can cause artefacts when displacing, or show cuts in the Bump or Normal maps. Once the Displacement and Bump maps render cleanly, continue adding other texture maps. For lighting, use an HDRI to provide the lighting information of an ocean storm scenario. To create the rim light effects on the creature's left side, add an area light at the appropriate position. Another area light can be added to emphasise the specular highlights caused by lightning.

16 Render passes When working on the final composition, it's important to be able to edit individual objects through masks, so you can adjust highlights, reflection and depth, or to tweak intensity and brightness of each light. In order to gain full control over the features of the final image, render out a number of passes. Next to the standard ones like Beauty, AO and Depth, render a pass for RGB Lights, Object Space Normals, Reflection, Specular, Shadows, RGB Masks, Fresnel and fine AO. By disabling all the Bump maps, we'll render an additional Specular pass of the highlights only caused by the Displacement maps. This will enable us to adjust the bigger highlights of the skin and scales. The image above shows some of the passes I rendered for the final composition.

17 Tweak the final composition Using the previously rendered passes and adjustment layers for colour correction like Brightness/Contrast, Color Balance, Hue/Saturation, Curves and Levels, we'll end up with a base version of the composed image. This is going to be the starting point for the final touches in Photoshop. The background is based on Cloud layers in combination with Custom Cloud brushes. For the water splashes, experiment with different types of Noise layers as well as Water brushes. Render passes allow for a lot of experimentation when creating effects and tweaking the image. The Depth pass can be used to create a depth of field effect or as a mask for a Saturation adjustment layer. The fluorescent lights can be used to draw the viewer's eye to the face, as they are the only objects with a glowing turquoise colour. Flipping the image horizontally from time to time is a good way to refresh the eyes and to spot composition issues.

Conclusion

Working on a project of this scale can be quite a challenge, but it's also good training as it covers multiple disciplines of the design process, from modelling, sculpting and texture painting to shading, lighting and rendering. You also learn how to stay organised and think ahead. Breaking this project down into smaller steps made it easier to plan and was therefore more feasible.

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Step by step

Easy-to-follow guides take you from concept to the final render

Atmospheric arch-vis renders

Gardenian House 2013

> I wanted to create a romantic atmosphere, with the cool blue of the sky contrasting with the warmth of the lights and resulting in a mix of beautiful colours, making for a stunning hidden sanctuary

Sérgio Merêces is a professional 3D artist who provides 3D visualisations to clients all around the world

Artist info

Sérgio Merêces

3DArtistonline

Username: smereces

Personal portfolio site
www.sergiomereces.com

Country Portugal

Software used 3ds Max, V-Ray, Forest Pack, Photoshop

Expertise 3D visualisation production, specifically exterior and interior renders

Storemags.com

Here I'll reveal my project workflow and the steps you need to take to achieve the best results in your arch-vis renders. I'll explain the workflow and techniques that I use daily when creating visualisations. I will also cover important steps such as how to set up the lights and environment of the scene using HDRI maps and V-Ray lights. I will also explain the best way to create textures and materials for the assets, plus the tools required to create the vegetation.

Finally I'll explain the post-production process, particularly how to edit the RAW render image in Photoshop using tools such as curves, corrections, adjustments and filters to enhance the final render.

Concept

For this project – and for all my projects in general – I always take the time to search for references for my main idea, as this will help with the process of modelling, creating materials and understanding lighting.

With the Disc

Tutorial files:

- Vegetation models
- Chinese lantern model
- Tree model
- Tutorial screenshots

Learn how to

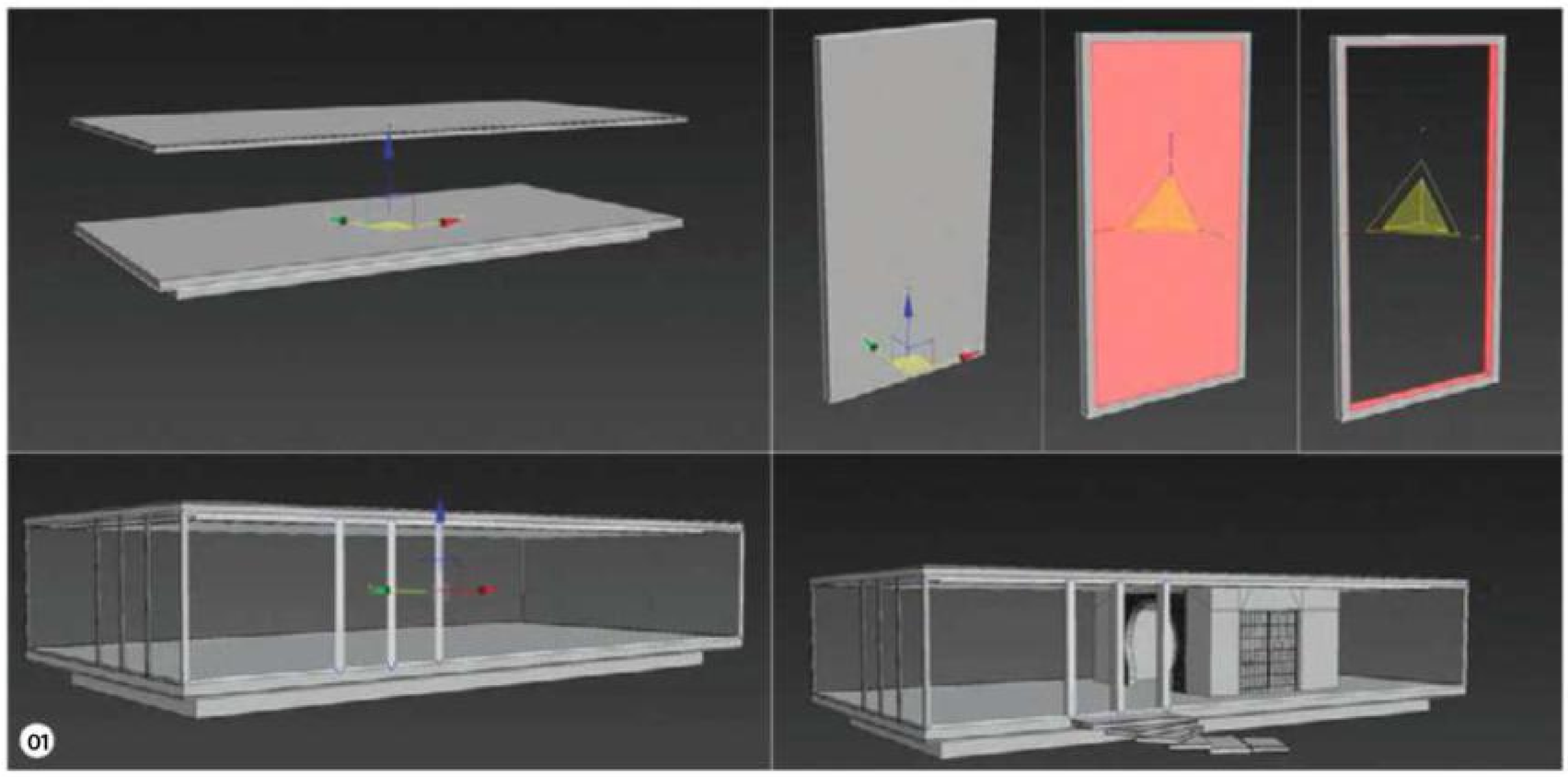
- ☑ Create models, materials and textures
- ☑ Use Object Scattering for vegetation
- ☑ Adjust lighting for certain environments

Storemags.com

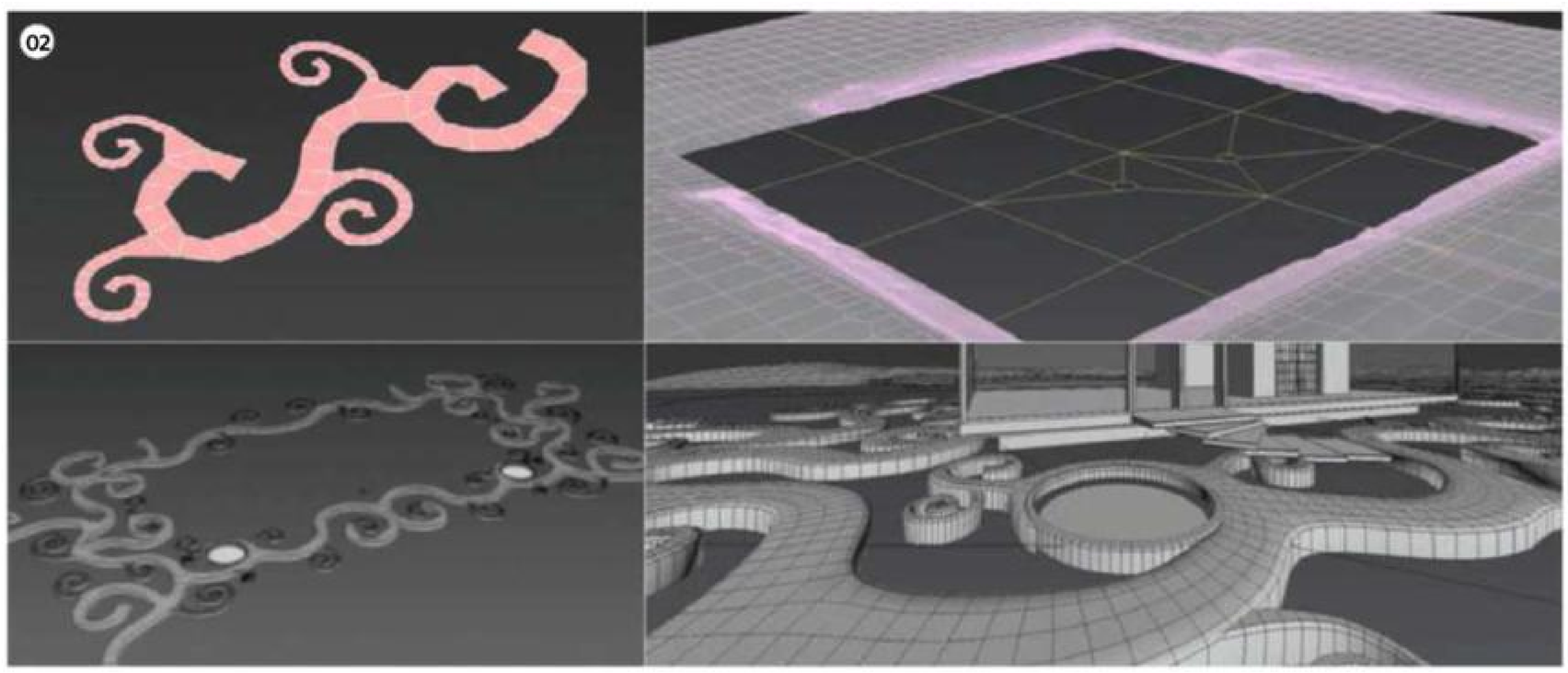
Modelling, texturing and materials

Set up your assets for the scene composition

01 Exterior and interior modelling We will start by creating the floor and ceiling of the house from boxes, then using Edit Poly to get the right form by moving the vertices and adding a chamfer to the edges using the Quad Chamfer script available from **www.mariussilaghi.com**. Next we'll model the window frames and glass from a box and with the Edit Poly tool we'll inset the two front faces of the box, then bridge them to get the main frame form. After this we need to copy the boxes and adjust them, subtly moving the vertices. Repeat this step on a larger scale for the interior walls.



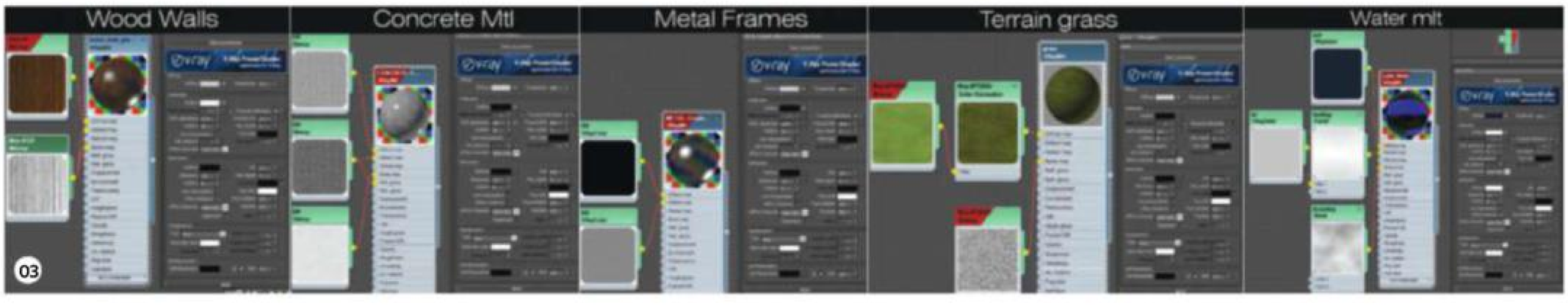
02 Create the terrain To create the terrain and design of the water paths, draw them with the 3ds Max Freeform tool. This way we can achieve the exact look that we want and it can be completed relatively quickly. After drawing all the terrain, convert it to Edit Poly, then Extrude all the faces to set the terrain height. Finally, to add more detail into the render, we need to apply a chamfer to the main edges and then apply the MeshSmooth tool. For the Foreign Terrain we need to use a plane and then convert it to Edit Poly and model it with the Freeform Push tool, painting all the terrain elevations. See the accompanying image for more detail.



03 Textures and materials For the house interior we'll create base materials using the VrayMtl, then create the wood for the walls, floor and ceiling, concrete for the base and entrance stairs and metal and glass for the frames. For the terrain, create a simple VrayMtl with a grass texture. Also use a VrayMtl for the water. To create ripples and waves in the water it's better to use a Bump material as it creates a more realistic effect than using VrayDisplacement, which takes much longer to render. However, there are cases where using VrayDisplacement creates a better effect – use whatever suits your scene and needs best.

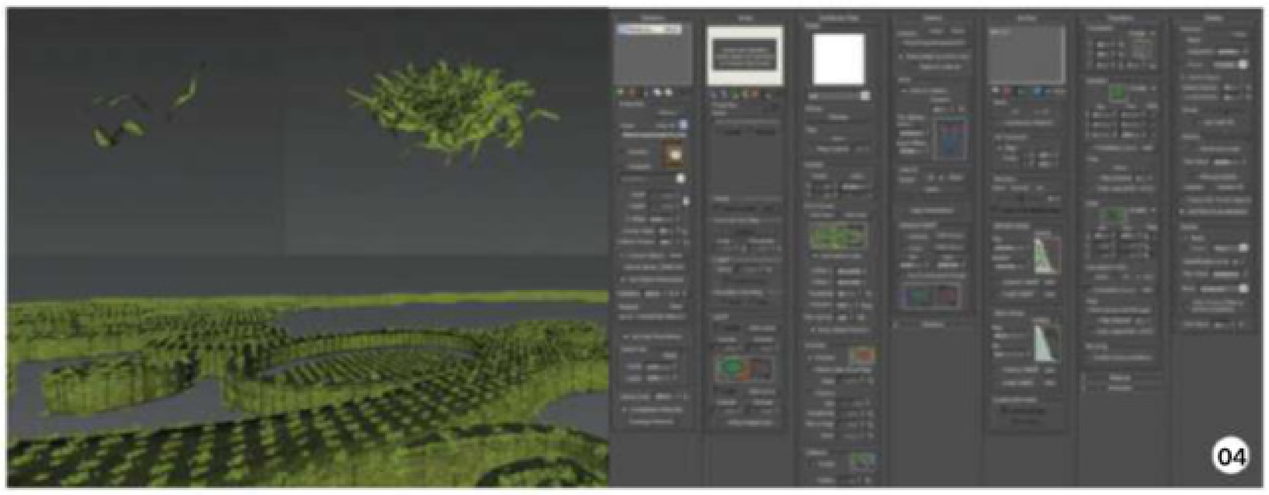
Modelling with Ribbon Tools

3ds Max comes with many useful tools to facilitate the modelling process. To create water I use the Freeform and Strips tools to design the terrain by drawing it in Freehand mode and then create all the elevations with the Push/Pull tool. To fix the geometry wireframe I use the retopology tools, allowing me to create new faces quickly. Throughout the modelling process I use tools such as Swift Loop to create a quick edge loop; the Qslice tool to slice parts of the models; and the Cut tool to cut model edges.



Vegetation and Objects Scattering

Create vegetation and scatter objects using the Forest Pack plug-in



04 Grow the small grass For the terrain we must create a small grass model and spread it. To create the small grass group model one blade and, using the Advance Painter script, copy it to create a small group of grass. Now it's time to spread the grass model over the entire terrain. To do this create a new Forest Pack Object and choose the model of grass that we just created as the Scatter Object. Use the Distribute map and Transform settings to define how the grass will be spread. Check the accompanying image for settings.

05 Add water lilies In this example I used several models of water plants from the Forest Pack preset, and one from Evermotion Archmodels 124. Create a new Forest Pack Object and this time, as we want to spread more than one Object, we need to create five new layers using Add New Item. After you've chosen all the items you wish to be spread, we need to let Forest Pack know which models to spread more than others by using the Probability option. By default this is set to the maximum value of 100%. We need to decrease this value for the models that we want to have less of a presence in the scattering. You can use the Paint tool too but it's a more time-consuming process.

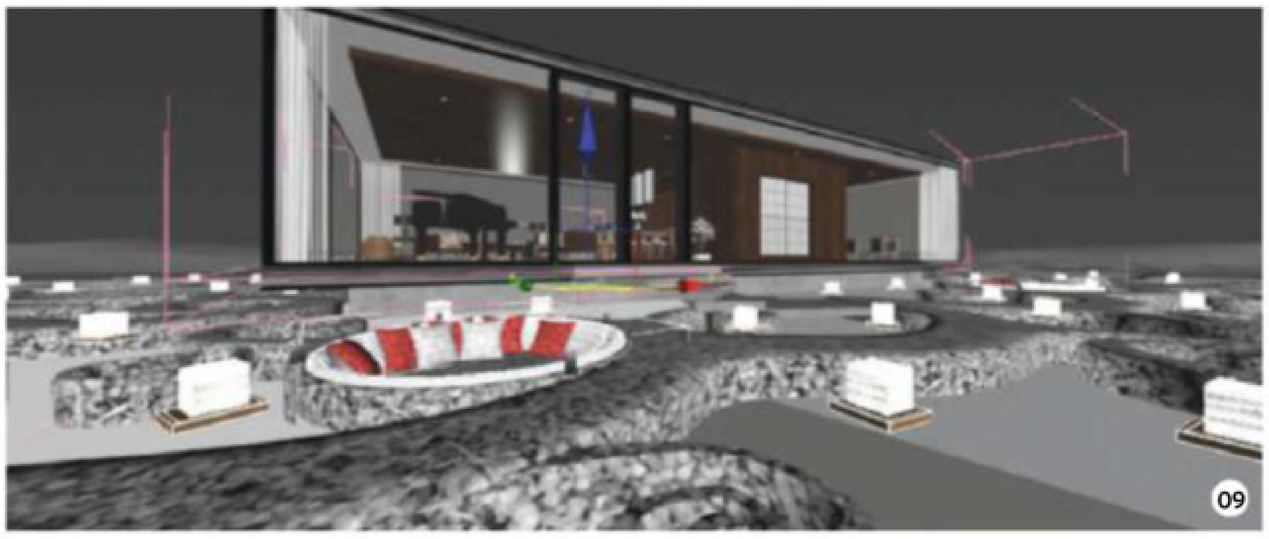
06 Place leaves on the water We will now model one leaf from a normal plane with four length segments and seven width segments. Convert it to Edit Poly and then move the vertices to make a realistic leaf shape. Next, create a New Forest Pack Object, choosing the leaves as a Scatter Object and the water plane as a Distribution Object. In this scene I want the leaves more dense in some areas than in others, so I will use the Paint tool to do it manually, painting in the dense areas and erasing in areas where I want less leaves.

07 Background bushes and grass For the bushes I added a model that I already owned and for the grass I used a lawn grass from a package. Create a new Forest Pack Object and two separate layers – one for the bushes and the other for the lawn grass. Next, we need to set the Probability with a higher value for the lawn grass and a lower value for the bushes, then set the Transformations to get random values for scale and rotation. This creates a nice mix between them and will work perfectly for the background. As the background will be relatively far from the camera there's no need to worry about detail here. Ultimately it's about the overall effect.

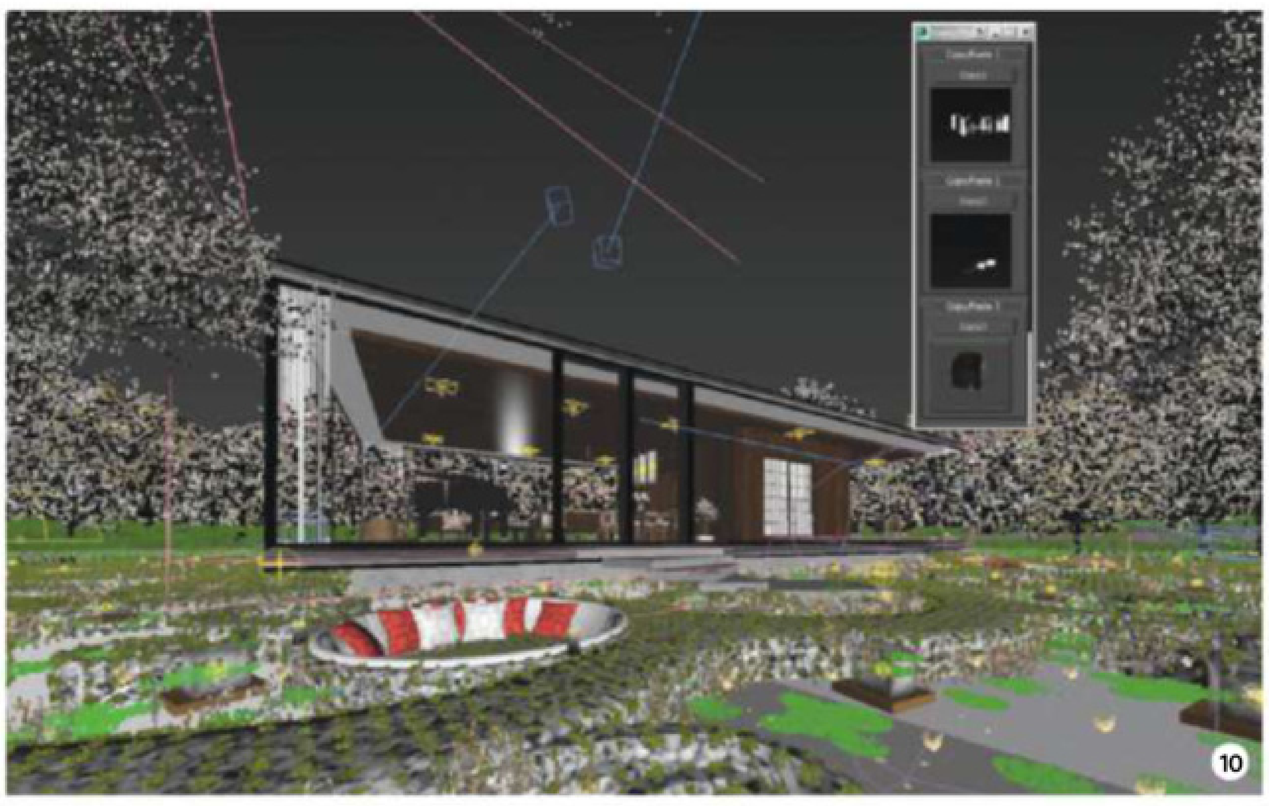
Add finer details

Create and place the lanterns and interior objects

08 Model the trees I like to use SpeedTree to model my trees. Begin by creating the main trunk in SpeedTree, followed by the branches. To create an authentic shape we need to adjust the Skin and Shape parameters. For the branches we'll need to create two or three levels of branches to get a more realistic look and to increase the detail for the leaves. The next step is to create the leaves that will be spread along the last branches level. Do this by creating a node for the leaves and then creating a new material with the leaves textures and alpha to be used by the leaves mesh. Finally we need to adjust the density and position of the leaves by tweaking the Frequency and Placement until you have achieved the desired look.



09 Create the Chinese lanterns I used Forest Pack once again to spread the Chinese lanterns across the water. I tend use Forest Pack quite often when I need to spread 3D models across a scene because it has the advantage of making the viewport lighter and can be used even with a huge number of models. Create a new Forest Pack Object and choose the Chinese lanterns as Scatter Object and the water as the Distribution Object, then, using the Paint tool, start to paint the lanterns randomly across the water.



10 Work on interior objects For the house's interior objects we will create a new 3ds Max file, merging only the house so we can manage and compose the interior easily, and test some compositions until we're satisfied with the result. Next we need to copy and merge them into the 3ds Max scene file using a script called Copitor, available from **www.scriptspot.com/3ds-max/scripts/copitor**. With this script you can transfer objects from one file to another in two clicks.

Leaves in the wind

For the leaves in the wind I created a Particle Flow event, where I chose for the leaves to be spread by the particles. I created a wind and gravity effect to influence the spread and to give it a more realistic effect. I adjusted the Particle Flow parameters so I could control and manipulate the scene to look the way I like. Afterwards, I converted the leaves into a mesh using Compound Objects>Mesher.

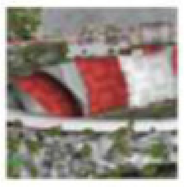
Artist showcase

Sérgio Merêces

Sérgio is CEO and lead 3D artist at Merêces Arch-Viz, an award-winning 3D visualisation studio based in Évora, Lisbon. The studio's work can be seen globally in many industries and markets. The team applies the most advanced techniques in all its works, always striving to make unique works of art. You can learn more at www.new.sergiomereces.com

Silent House **3ds Max, V-Ray, Forest Pack, Photoshop (2013)**
This is a personal project. I wanted to experiment with the V-Ray 3.0 Beta and the Forest Pack plug-in

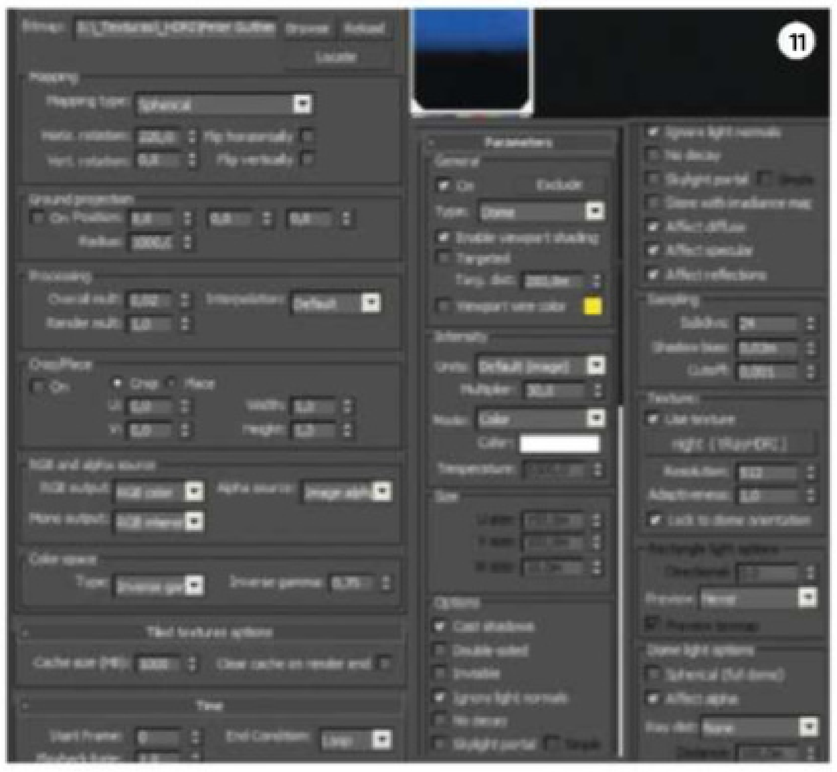
Hotel **3ds Max, V-Ray, Forest Pack, Photoshop (2013)**
This is one part of a four-part project for a client. I wanted to set it in dramatic atmosphere



Lighting and environment

Set up the scene's lights and environment

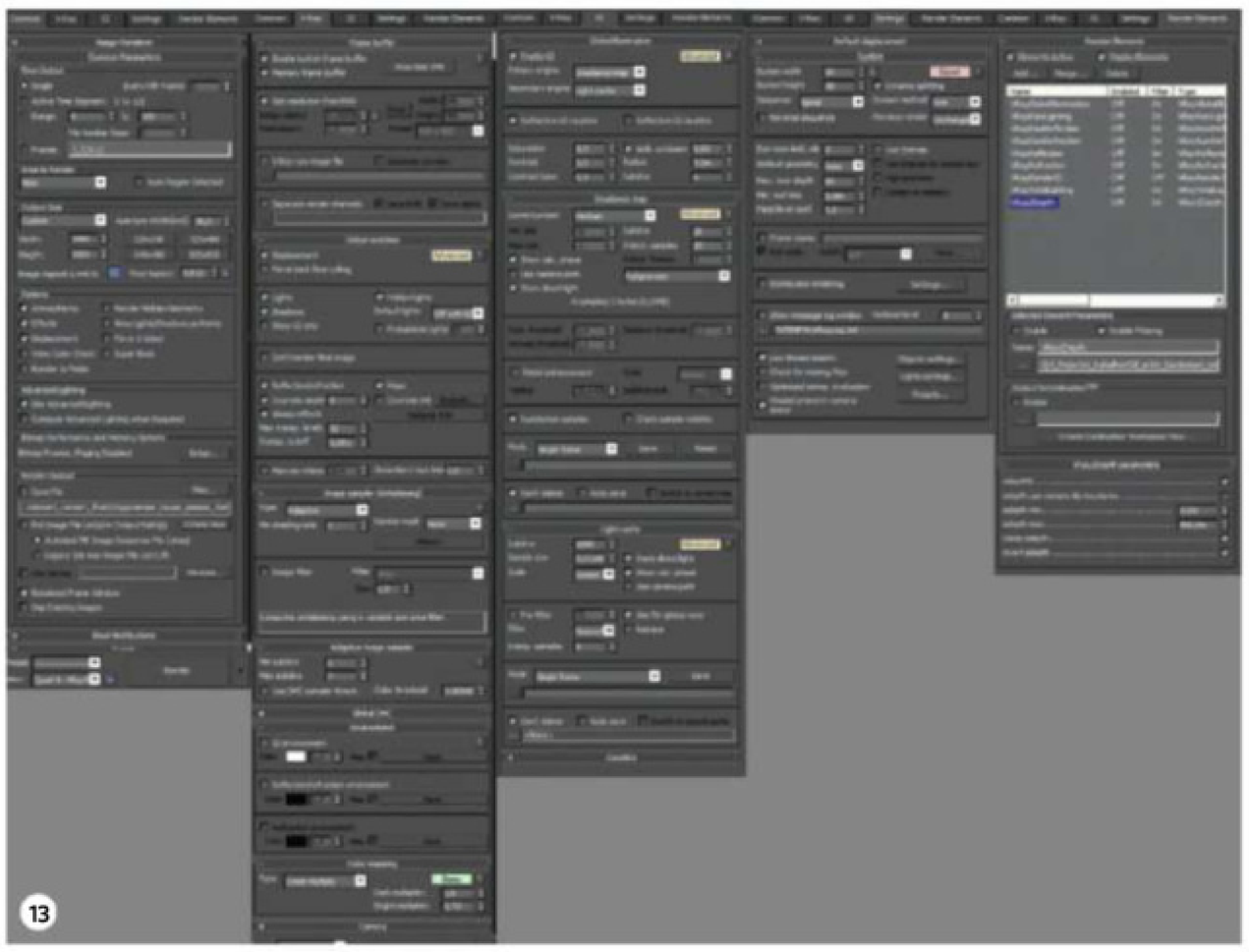
11 Lighting setup For this scene I used only one main light for the entire scene illumination, VrayLight's planes for the house interior and spherical VrayLights for the Chinese lanterns. These lights have a warm temperature to create a nice contrast between the cool exterior blue of the environment and the warm yellow colours of the interior. For the main light create a VrayDome light with a HDRI map – in this case we'll use one from **www.3docean.net/user/paguthrie**. To adjust the light use V-Ray RT and a material override to test and adjust as necessary. In my case I needed to adjust the HDRI map settings, as you can see in the accompanying image.



13 Render settings For the render settings it's important to balance the best results possible with a relatively fast render time. Personally I like to run a few tests so I can optimise my render settings, which I prefer to be no more than 12 hours maximum. My final render resolutions are usually between 4,000px and 6,000px to achieve a nice level of detail and definition. This particular image was rendered with 5,500x and 300 DPI. You can view the various render settings I used in the accompanying screenshot. Once you're done, we're all set up to crack on with the post-production in Photoshop.

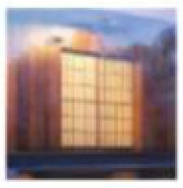
Creative Hub **3ds Max, V-Ray, Forest Pack, Photoshop (2012)**
A 3D visualisation of a creative hub building, designed for an architectural project

12 Light the environment For the environment we will be using the HDRI map that we used for the main illumination. In this case we'll use the HDRI map for both the light and the environment. Place a copy of the HDRI map into the 3ds Max Environment Map Slot, then to ease the adjustment process, press Alt+B to open the viewport configuration and set it to Use Environment Background. Using this we can now adjust the background and compose our environment to find the settings that best suit your scene.



V-Ray RT

To refine your composition I really recommend using V-Ray RT to preview and adjust the scene illumination. V-Ray RT is a brilliant feature which enables you to adjust the lighting in real-time, giving you full control of it and letting you test many possibilities until you've found the desired illumination for your scene. I use V-Ray RT to create and preview my scene materials too, and to see how they will interact with the scene illumination. This is an important step in attaining the best and most realistic look from the materials.



Post-production

Bring your render to life in Photoshop

14 Import and organise render passes Open the RAW render file in Photoshop, then open all the render passes into the RAW render project as layers with the Place tool. To make things easier we'll create several folders. Create a folder with the name Masks, where we can put all the masks that we'll use to quick select parts of the image. Create a second folder called Corrections, where we'll put corrections of the RAW render image, such as any little mistakes that crop up in the render and can be easily fixed in post-production. The third folder we need to make should be called Adjustments, where we will put our colour adjustments. Finally, create a folder called Effects where we can place image effects.

15 Corrections In all renders there are small accidental mistakes that crop up from rendering the scene. In most cases these are little things that we can't actually see before we render the image in full resolution. Thanks to post-production, when they do crop up they can be easily fixed. In this image there are a few bad lighting calculations and texture errors. To fix these, create a new Layer in the Corrections folder and use the Healing Brush Tool, Patch Tool and Clone Stamp Tool to get rid of as many of the flaws as possible.

Sharpen the result

One of the last things I do in post-production is to sharpen the final image by creating a detail pass. To do this, go to Filters>Others>High Pass. This will open a window where you can control the strength of the sharpen with the radius amount. After putting in the desired amount, press OK and set this layer to Soft Light.

16 Adjustments For the adjustments we should create a new Exposure adjustment layer to fix some of the gamma, as in this instance the RAW render image came out a bit darker than expected. We also want more light in the shaded areas to create a nice balance in the final image. Next, create a new Curves adjustment layer and adjust the Blue Channel to maintain a nice balance between the blues and reds. We then need to add a new Levels adjustment layer to edit the overall levels of the image to create a slightly more dramatic tone.

17 Effects and final adjustments We'll do the final adjustments in the overall colours of the image by painting some yellow tones in. Add a layer in the Effects folder and set it to Overlay, then paint with yellow and orange tones to make a really nice balance between the yellow lights and the blue colour of the environment. The final touch will be to add some environment effects such as fog to give some depth to the image. Use the VrayZDepth pass in Screen mode and add a Levels adjustment layer. On this layer we need to create a Clipping Mask to control the fog depth and intensity of the VrayZDepth pass.

• **DID YOU KNOW?** • All tutorial files can also be downloaded from: www.3dartistonline.com/files

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Artist info

Benoit Regimbal Cote
3DArtistonline
Username: mocha

Website
www.milkpresso.com
Country Korea
Software used
3ds Max, Photoshop

> I worked in games for years, back when low-poly was so important. I wanted to have the image represent that, and to show that even without a smooth look, things can still be interesting

Daily Life 2013

Daily Life **is mostly about the daily adventures of my wife, the cat and I in 3D form, from my terrible cooking to my wife's gardening skills.**

ZBrush | CINEMA 4D | V-Ray | Photoshop

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Nicolas Delille

3DArtistOnline
Username: ModernAgeStudio

Personal portfolio site
www.modern-age-studio.com
Country France
Software used ZBrush, CINEMA 4D, V-Ray, Photoshop
Expertise High-res character sculpting, texturing, retouching and photomanipulations

Create realistic macro wildlife

The Tarantula Walk 2014

"Build a tarantula and environment using ZBrush and C4D"

Nicolas Delille is a 3D artist currently working for various ad agencies and magazines

Here I will showcase my creation workflow in ZBrush, CINEMA 4D and V-Ray for creating close-up shots of wildlife in its natural environment.

Starting from scratch, I'll explain the workflow and techniques that I use daily in my CG process, beginning with modelling right through to final rendering.

First of all, we'll cover the sculpt of the tarantula using ZSpheres. This will enable us to quickly create a realistic shape for the tarantula. Next we'll start using the powerful DynaMesh tool, which will help to create a good retopology for our meshes. This is an important step for the hair placement. We will then sculpt some simple rocks to place our tarantula in a realistic environment. In the final sections we will cover the tricky process of placing hair on the tarantula with CINEMA 4D, finally using Photoshop in post-production to enhance the final result.

At the end of this tutorial you will have learned a set of skills that can be applied to many different projects.

Build the body shape

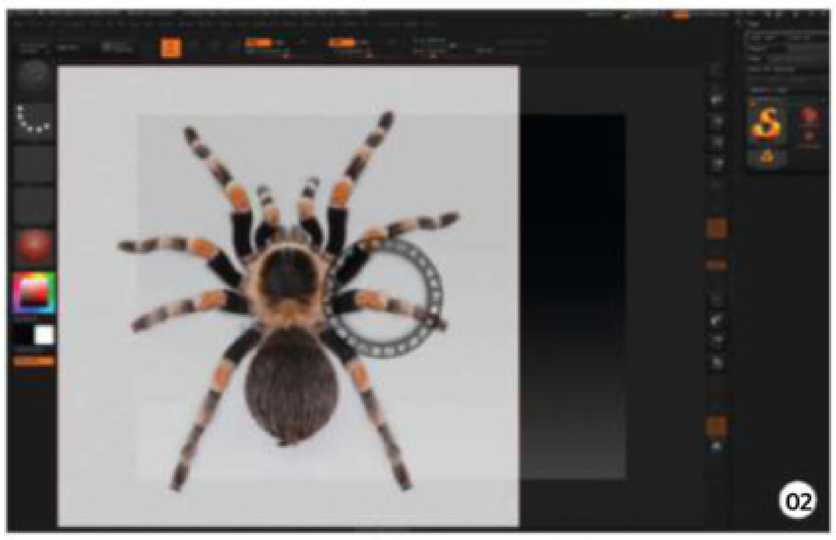
Research photo references and start the sculpting process

01 Find photo references During my reference research, I was surprised to discover that there are so many species of tarantula, each of them very different. Some have lots of hair, while others are practically bald. The length of the legs and the size of the abdomen varies from species to species, too. In this case I decided to go for a brown tarantula resting in its natural environment.

02 Use Spotlight In the texture menu, load your photo reference with Spotlight to place it in the background, then lower the opacity. You'll then be able to start the ZSphere process easily, following the shape of the tarantula. Never underestimate this first step – good reference is key to a successful final render, so take your time in choosing the image you base your sculpt on.

03 Start with a ZSphere Press Z to leave the Spotlight menu but keep the image in the background. Append a ZSphere and start sculpting with symmetry on. Start with the body, then the legs, each with five segments.

01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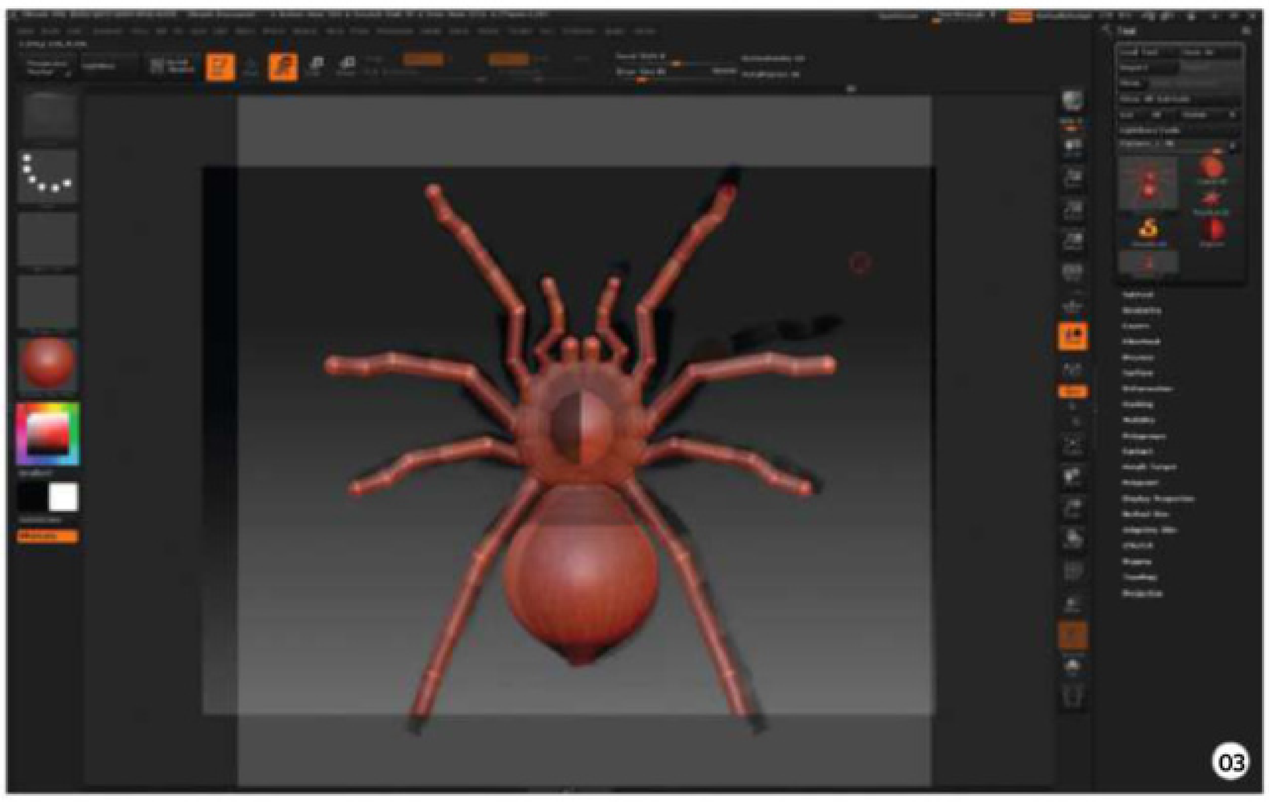

03

Spotlight trick

Spotlight is a powerful tool that was originally designed for the painting process. However, it can also be used as a guide to build your mesh shape. Import your reference, press the Z button to lock your photo in the background and adjust the opacity. You can then start your ZSphere or DynaMesh process, making your sculpt match the photo in the background. This is an easy way to create the perfect base mesh in a matter of only a few minutes.

With the Disc

Tutorial files:

- Rock textures
- Tutorial screenshots

Learn how to

- Use a ZSphere, DynaMesh and ZRemesher workflow
- Generate hair on V-Ray
- Set up a realistic lightning with HDRI and area lights
- Set up V-Ray render settings
- Enhance your final render with post-production

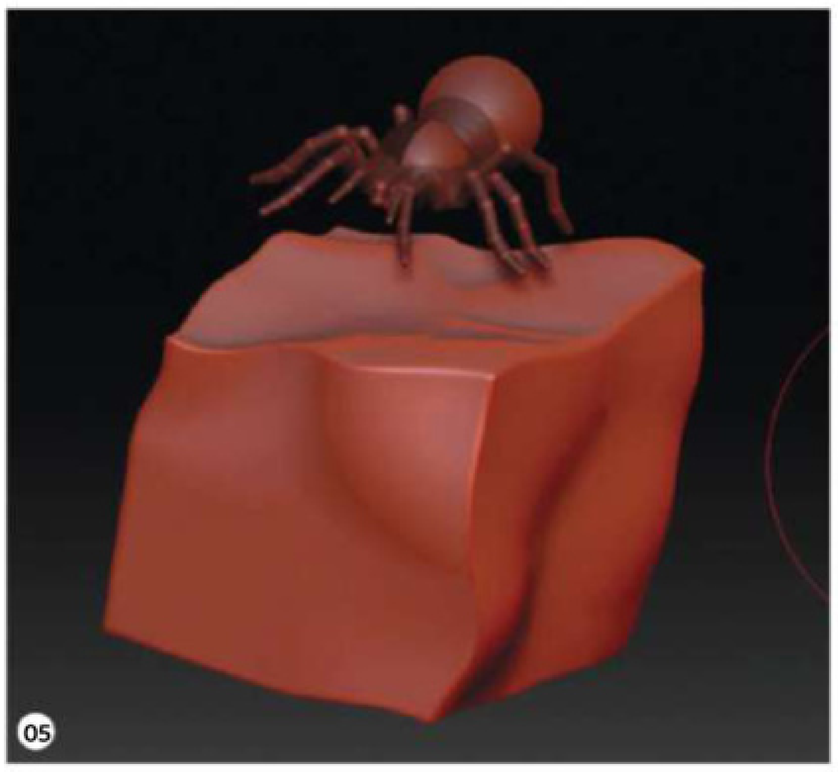
Concept

I'm very passionate about animals and outdoor imagery. The idea behind this was to express my admiration for nature using the excellent tools in ZBrush, V-Ray and CINEMA 4D.

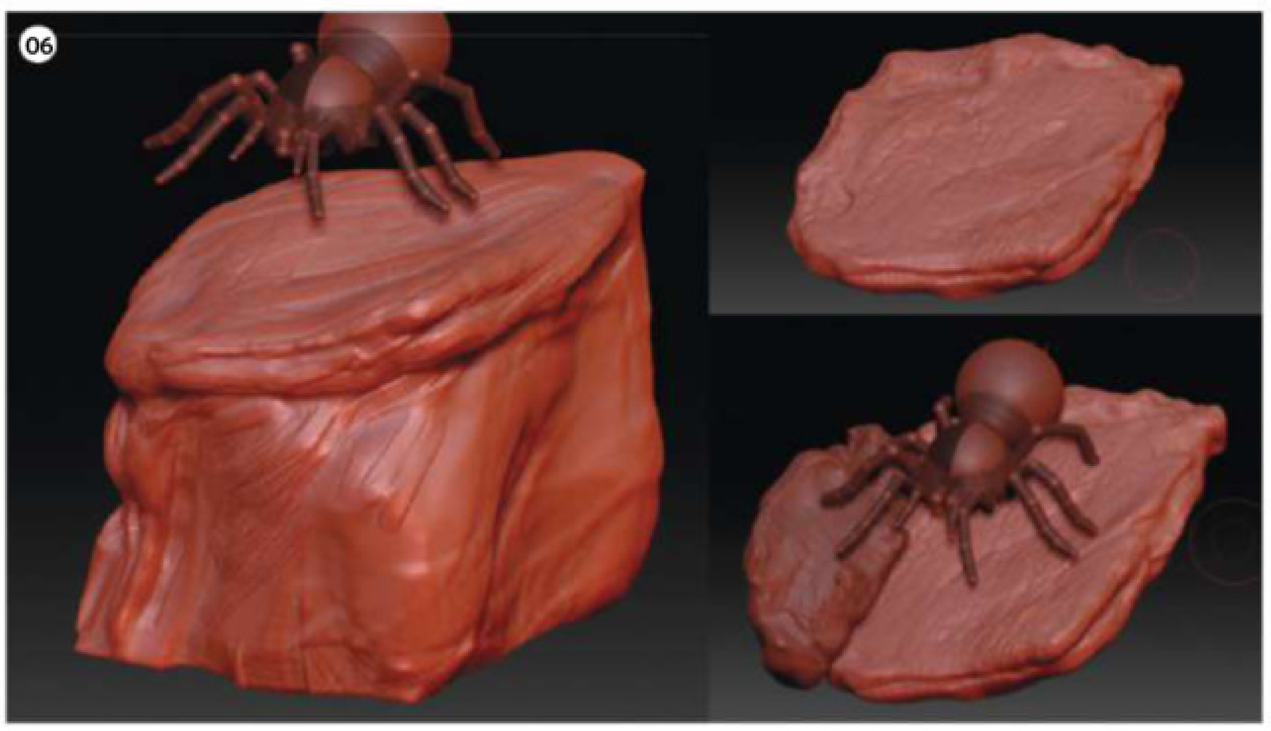
The tarantula and its environment

Refine the shape of the tarantula and build the rocks

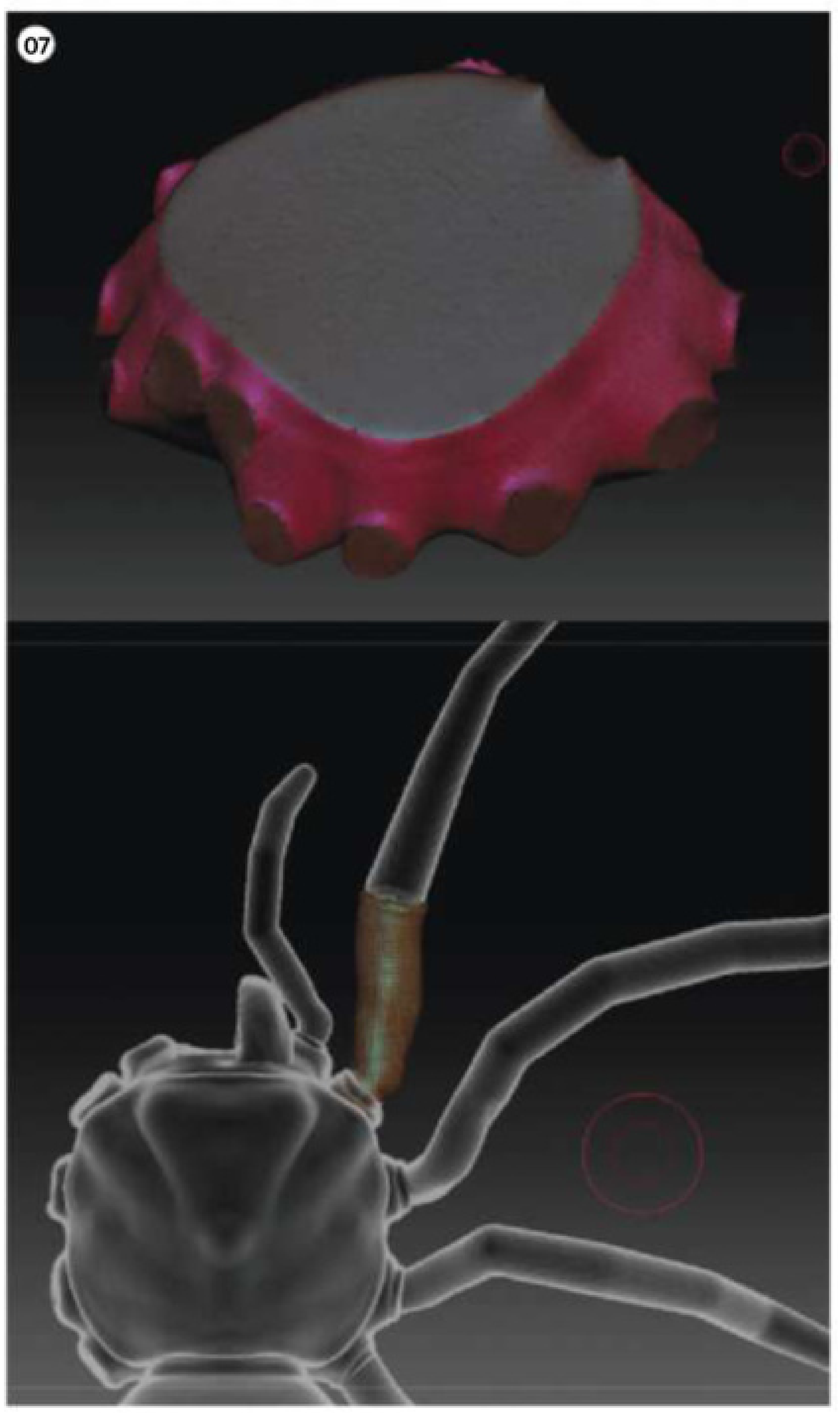
04 Regroup symmetrical sections Once you're done with ZSphere, make an adaptive skin at the second level of each piece. You should regroup each symmetrical part into similar polygroups, as we want to have individual parts for posing later on. At this point, we can keep the head and the body – the central parts which don't have symmetrical copies – and remove the legs from the right side. We will work on four separate legs and then duplicate them.



05 Build the rocks At this stage it's a good idea to start creating the rock. Add a cube to the scene and start to sculpt it. We will be using references in this step too. Put the ZSphere spider in to fit to the scale and to see how the composition will eventually look. For the rock creation we will use the DynaMesh tool at a resolution of 128. This enables us to make interesting shapes without topology problems.



06 Refine the rocks With the clay brushes, we need to quickly sketch some shapes so we have an idea of where we're going. In my initial render, I wanted the spider on two big rocks, but then I decided to keep the first thin rock and add the other rock to the left of my scene. When happy with the shape of your rocks, leave DynaMesh and use ZRemesher at half the resolution. With the topology done, we can now generate our UVs and carry on with subdivisions. We can use rock textures available from **www.cgtextures.com** for alpha brushes and for painting to help achieve a realistic rock appearance at high-resolution.



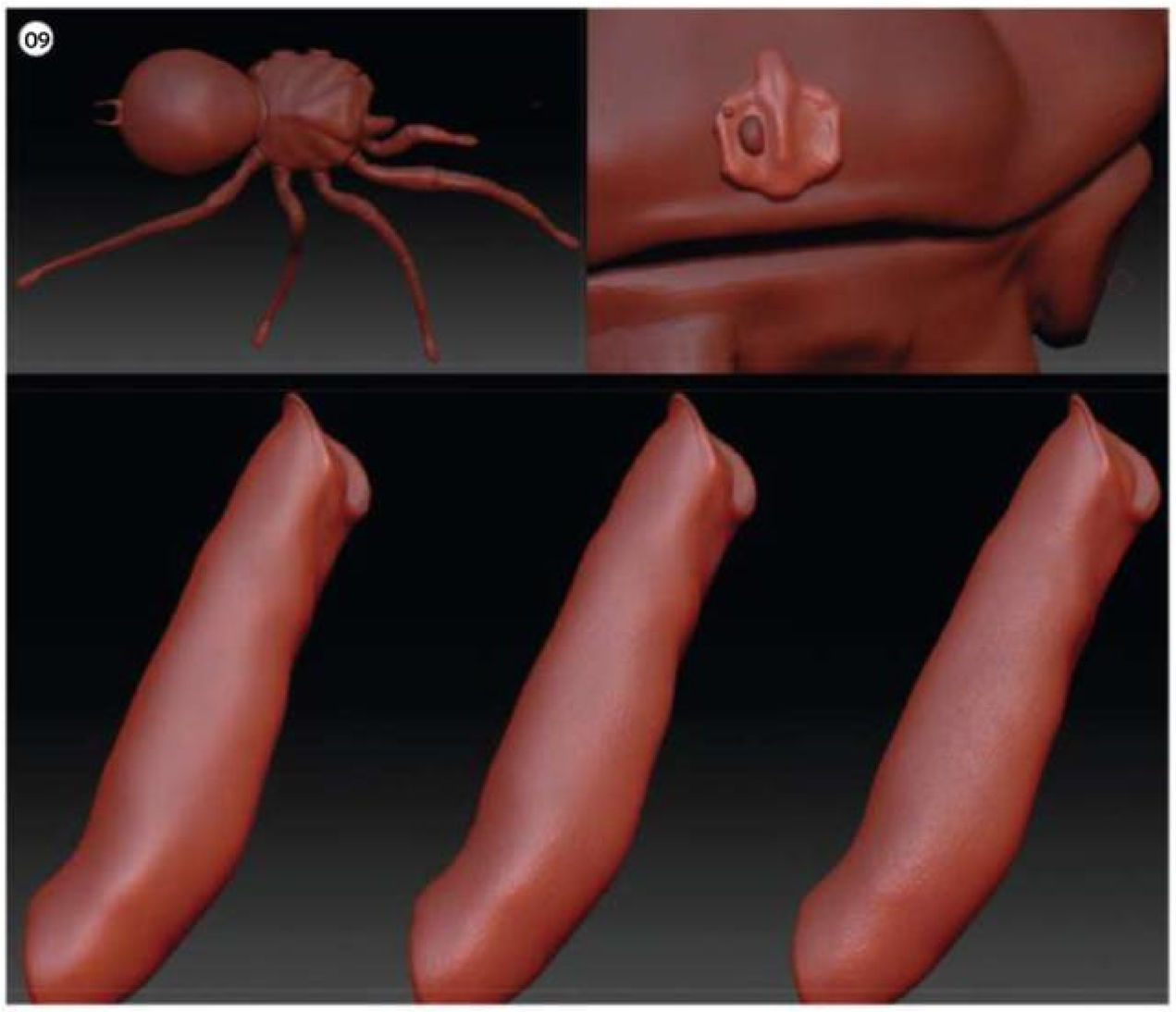
07 Detail the tarantula in DynaMesh On the spider we now need to use Group Split to divide our polygroups so that we can work on each part separately. It's easier to start with the body. Launch DynaMesh at 256 and start sculpting. Use the standard brush and the clay brushes to shape it, then do the same with all the other parts of the tarantula. If possible, have your references visible on another screen to help you if you get stuck. Once the shapes are finished, leave DynaMesh and launch ZRemesher to generate a clean topology, and then generate the UVs. It's important to have a good topology when it comes to creating the hair.

08 Draw guides in ZRemesher With the guideline in your brush palette, let ZRemesher know where you want it to build your topology. For this leg, I drew guidelines on the edges, and straight ones outside and inside.

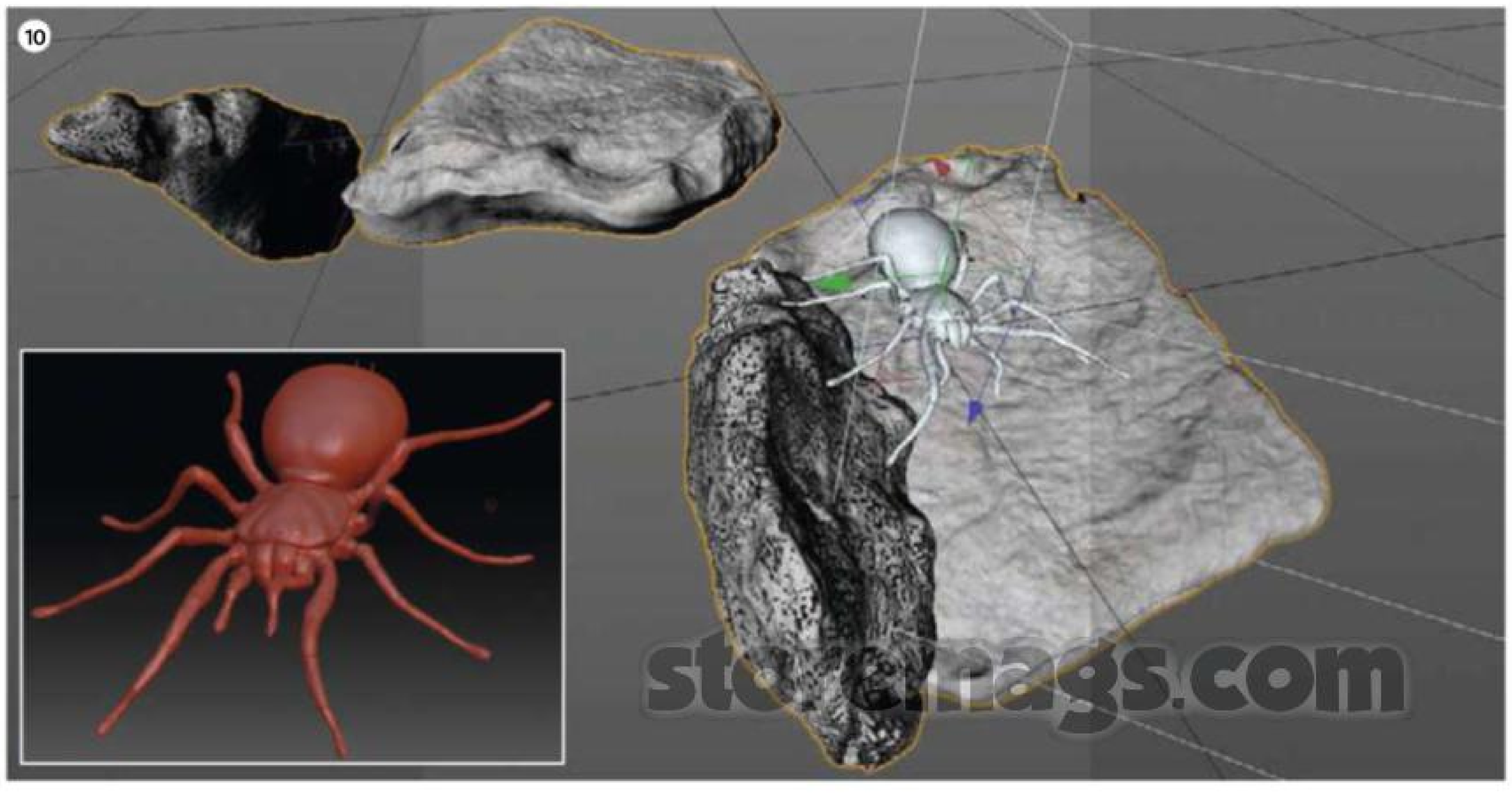
09 Finalise the mesh The body and legs are nearly done. Once the eyes are added to the mesh, the body shape will be finished. Now that all the parts have a good topology and UVs, we can subdivide them several times (the higher the better for details) and then add details with alphas and textures. I did some tests with sprays and alpha 58 to add wrinkles. Don't take too much time on this part – the hair will hide nearly everything! I painted the body in black with some colour variations and then I used Subtool master to duplicate the legs, so that the tarantula is complete.

Using ZRemesher

This tool is incredibly useful. As a one-click retopologiser, it eliminates the need to create your own topology. This is very handy and a great time saver. It's perfect for cleaning your DynaMesh topology too, which means you can focus your energy on your sculpt. Don't forget to use the ZRemesher guides in your tool palette to help ZRemesher recognise the direction you want your topology to follow.

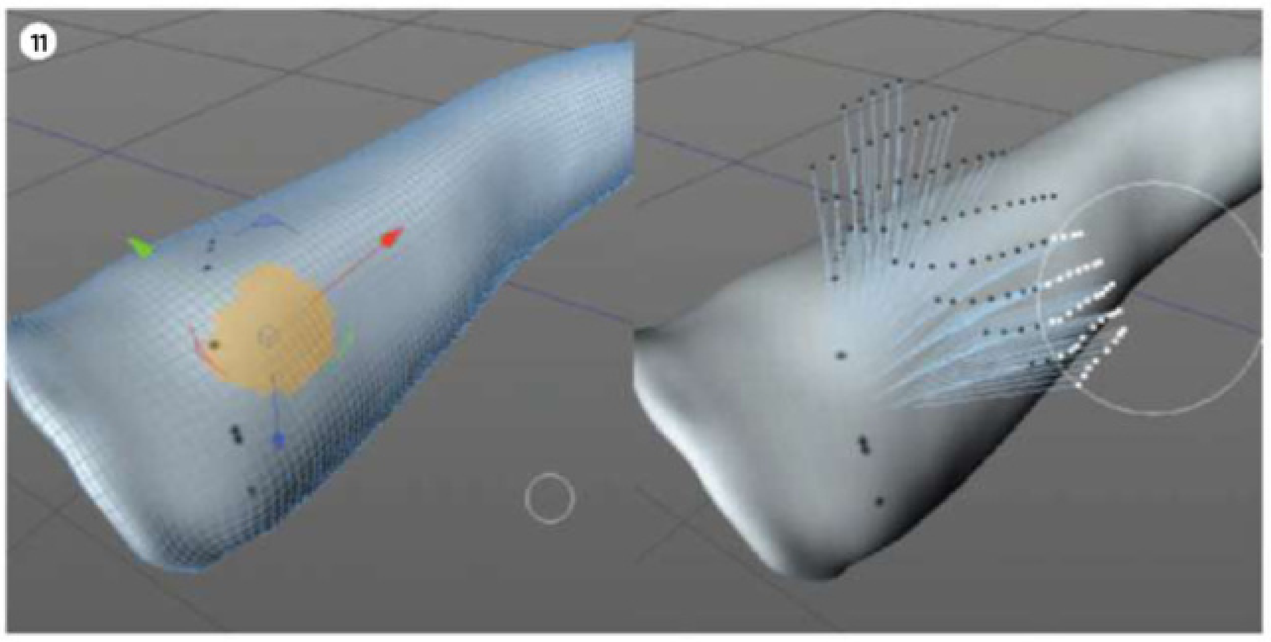


10 Export the mesh to C4D Now that all parts are highly detailed, we need to export the tarantula and keep the details by using Displacement maps. From the ZPlugin, launch Multimap Exporter and select a folder for the maps. With this you can generate Normal maps, Cavity maps and several other handy maps. For this tutorial we'll need the Displacement map and the Texture map at 4k. Now export your models and the maps to CINEMA 4D. Send the rocks too, so we can position the tarantula mesh in the rocky environment.



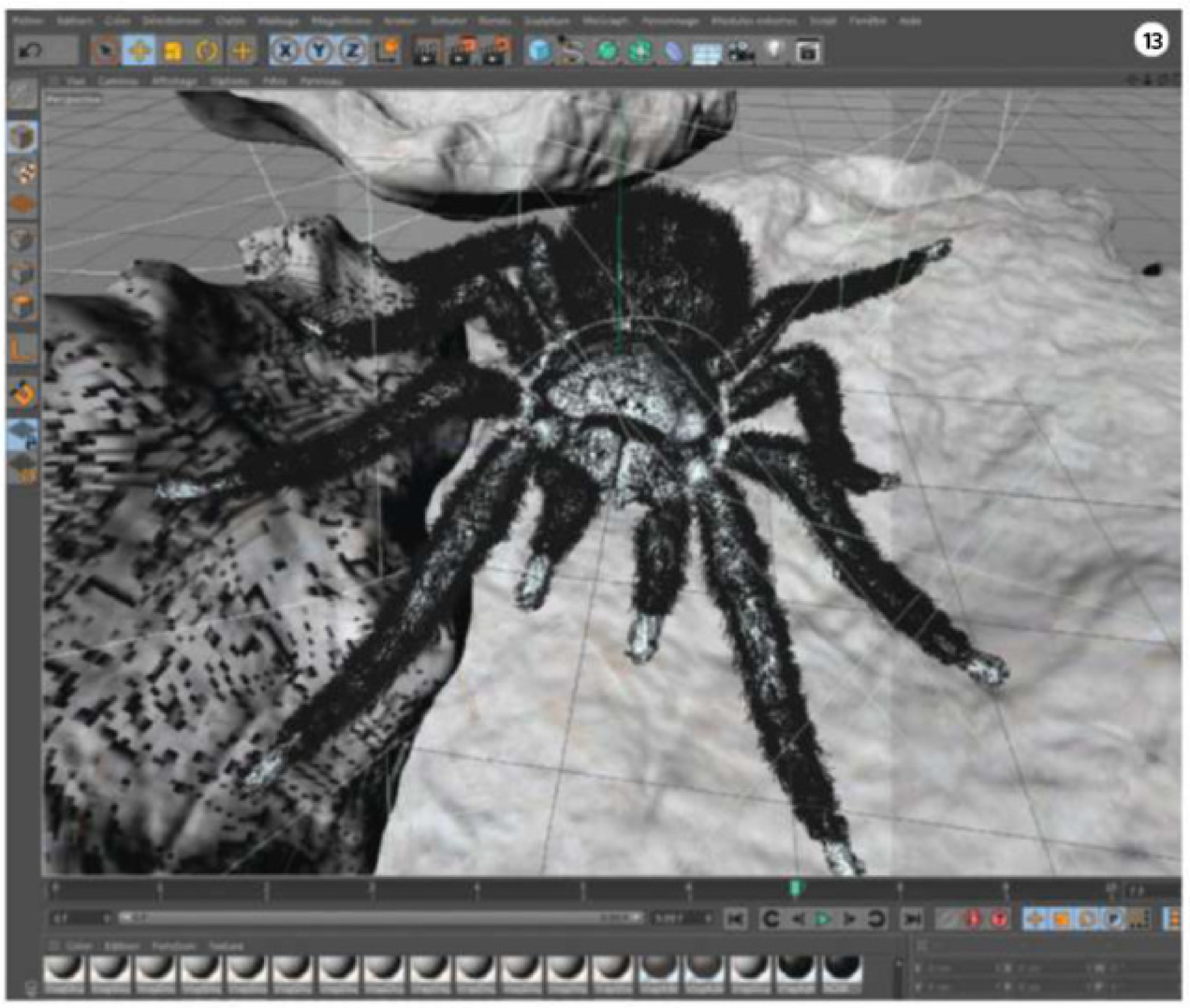
Create and spread hair

Edit the hair and fur settings in CINEMA 4D

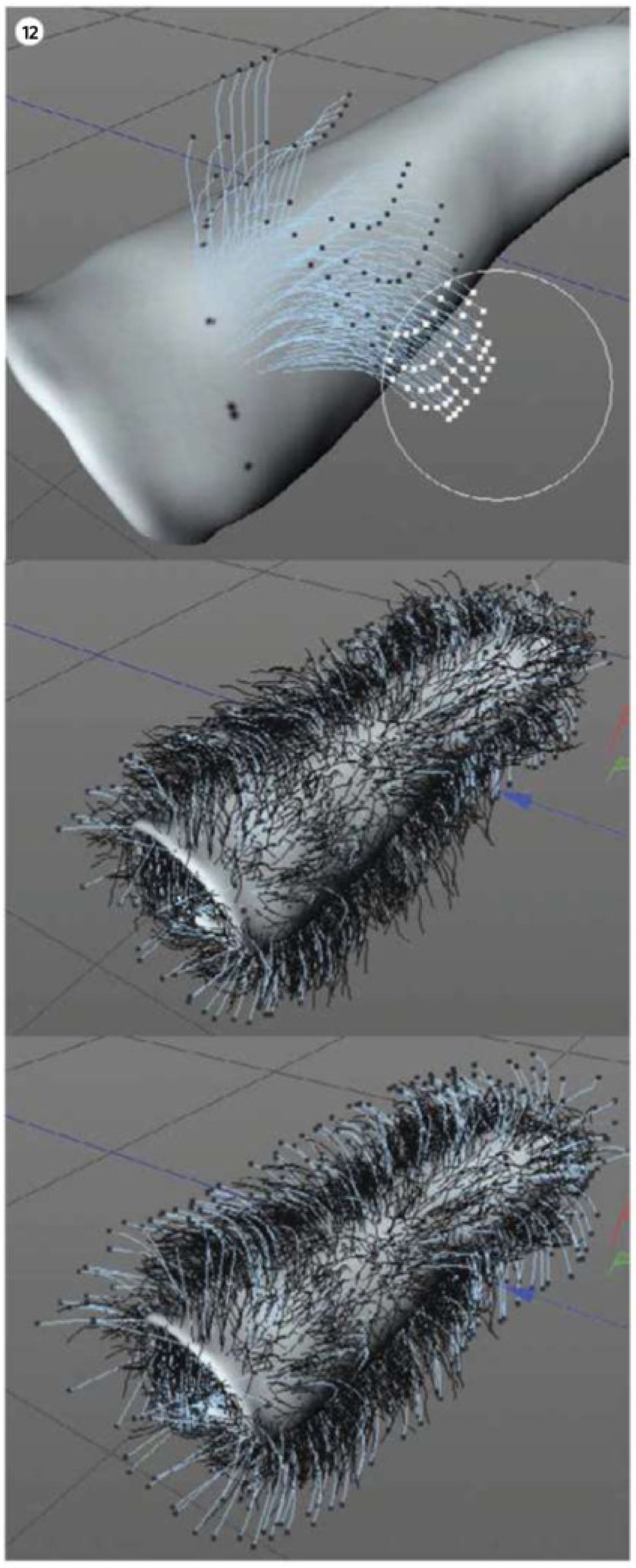


11 Generate hair A good topology will enable your mesh to have hair distributed equally on its surface, which is why ZRemesher is such a hugely useful tool. First, select any area you want hair generated on using the Polygon Selection tool. Next, select the Hair module, which will generate hair instantly. Try not to use overly high numbers for your guides. You can experiment with several options for the hair, using the hair parameters in the CINEMA 4D Hair Material.

12 Create individuality Once you've selected the polygon areas and generated hair, use the brush in the Hair tools to guide the hair in the direction you want. We can add hair to every part of the tarantula. In my case I chose to apply two types of hair. About 90 per cent are black hairs with 1mm length, and the remaining 10 per cent yellow with 3.5mm length. The yellow ones will be higher to give some colour variation for my hair. In the hair material, choose Frizz, Clump and Wave as the standard values to add a random pattern to the hair.



13 Test your renders Experiment with different values to achieve your desired effect, but only enable a few hair areas at the same time, otherwise your computer may crash. Make sure that you name every hair object in case it becomes lost. Enable Hair Lines in the Editor menu of your hair object and perform some test renders. It's time consuming, but you won't get a good result otherwise. I usually do tests with an Area Light Dome with a good HDRI.

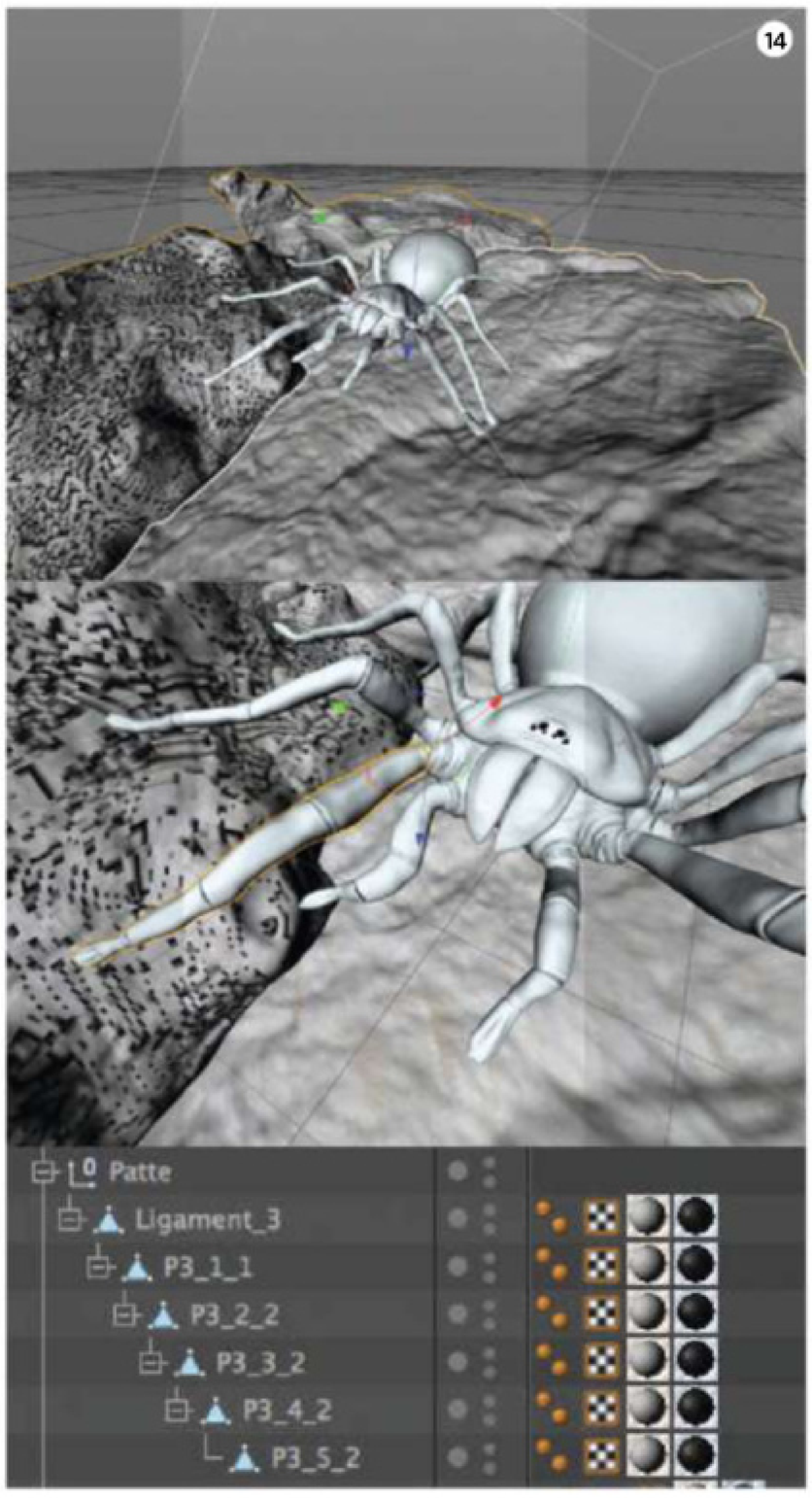


Useful improvements with V-Ray 1.8

This new release fully renders C4D hair without the need to use a Geometry mode. It's an update that many users have been waiting for. Another useful improvement is that it takes up less memory, meaning that it crashes less frequently. This is reassuring for those who create high-res images. You can now render with confidence!

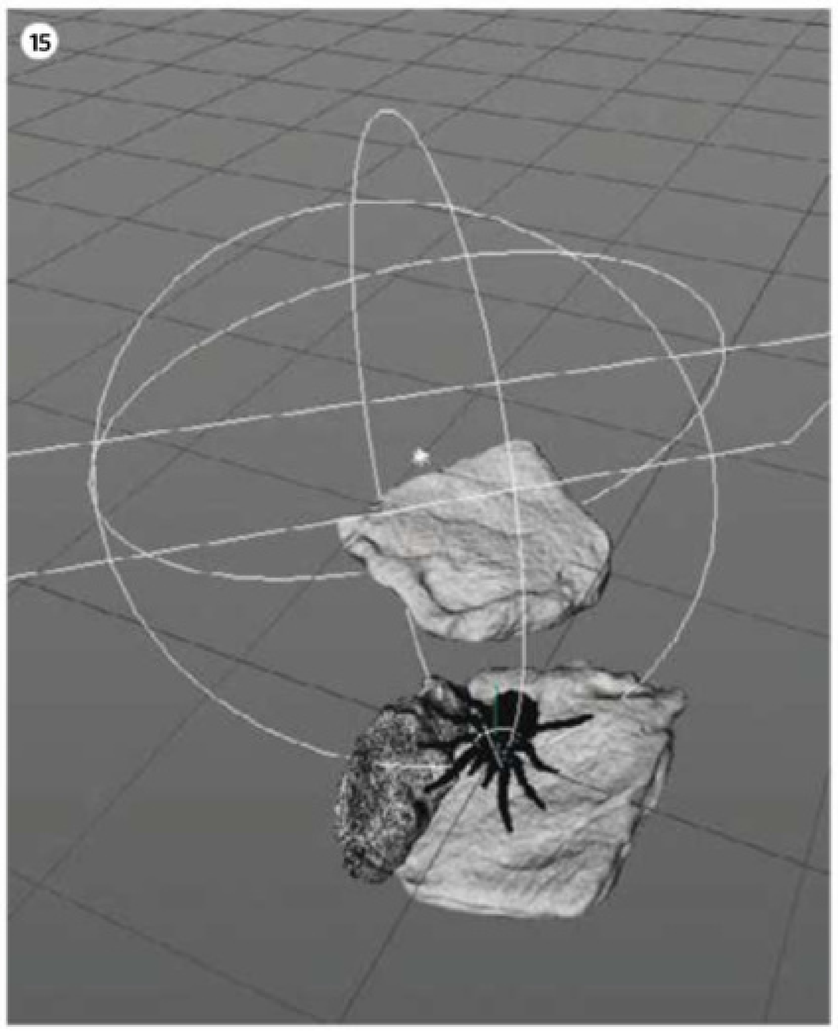
Lighting and post-production

Light and render in V-Ray and edit in Photoshop



14 Work on the final composition Using this workflow, even though hair is attached, you can still move parts of your tarantula if you're not satisfied and the hair will follow. To make things easier, I tend to create a hierarchy of the objects and each time set a pivot point. By doing this it's far easier to move the tarantula's legs if I so wish.

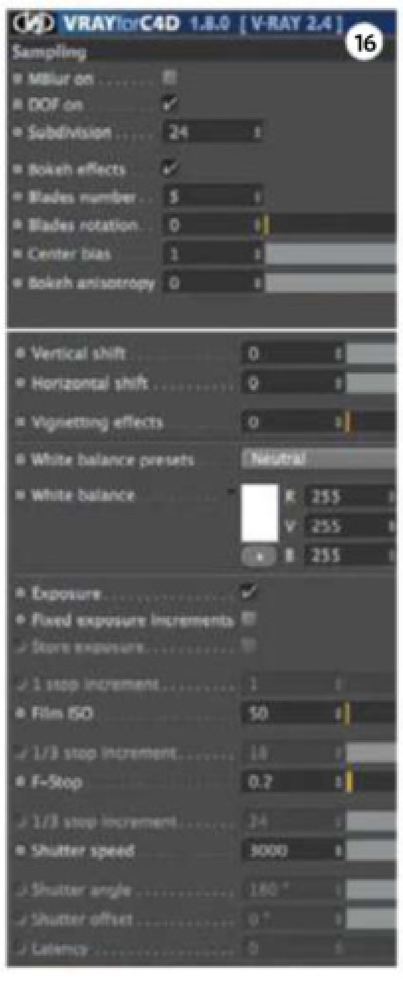
15 Set up lighting For my V-Ray light setup, I used an HDRI from **www.hdrlabs.com/sibl** for Global Illumination and environment, and a strong area light for backlight to simulate the Sun. I added an extra area light on the top-right of the tarantula to enhance the hair. Don't forget to set your HDRI image to sRGB for a better result.

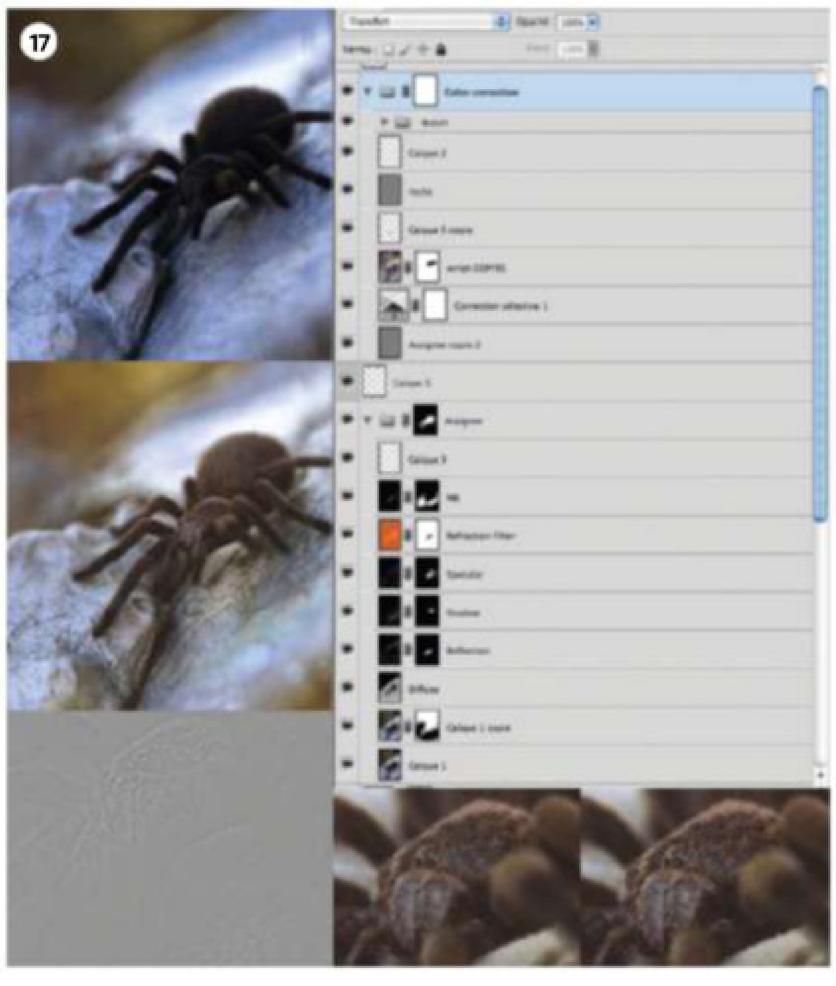


16 Adjust settings For the final render, set the DMC Image Sampler to 5, DMC sampler to 128 (lower it if rendering takes too long) and a Color map with a linear workflow set to 1/0.75/1. In this case we will set Gamma to 1 to compensate for the strong depth of field. Set the light and shadow subdivisions between 32 and 64, depending on the render time. For the camera settings, go for an ISO of 50, an F-Stop of 0.2 and a Shutter Speed of around 3000.

The art of test renders

You need to perform multiple test renders to see if everything works together before you create your final render. I usually do test renders with low AA, with the DMC sampler at 8, and all the light and shadow subdivisions set to 8. The most frustrating thing is when you combine depth of field and hair as this radically extends the render time. You will normally need to do several test renders, but you can't spend an hour on every test render. It will help to learn the settings to save time.





17 Retouch in Photoshop At this stage the render is still quite dark, so we need to lighten it. To do this we can either duplicate the image and set the copy to Screen mode, or we can use Level adjustments. I usually attach alphas to my duplicate layers and paint to make certain areas of the image lighter. We should also use render maps in V-Ray, which can be used to increase specularity, shade and more. This gives you real freedom to build on your final image. The downside to this is that with all these maps and layers, our final render will be very large. We need to add some colour corrections to add highlights to the scene. A good trick to add more detail to the image is to create a duplicate layer and desaturate it. Then, apply a High Pass filter to the duplicate and set the layer to Overlay mode. To finish off, retouch the hair and apply a photo filter set to 50% to decrease the black tones and to add a vintage tone. If you want, you can add a slight bokeh effect to the bottom of the image.

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“When working with fur I recommend loading a preset FiberMesh file from ZBrush’s Lightbox. Choose one that is closest to the style you’re going for. This will give a good starting point to tweak and refine the settings. My favourite brushes for grooming hair in ZBrush are Groomer Strong and Groom Spike”

Hellboy 2013

I created this image after being inspired by the concept art of Yang Qi. For me, it is always a great pleasure to work with a strong concept. Also, I hadn’t tried using FiberMesh in ZBrush, so it was a great opportunity to practice, challenge myself and learn new techniques that I could use later in my professional work.

I made this...

Incredible 3D artists take us behind their artwork

Artist info

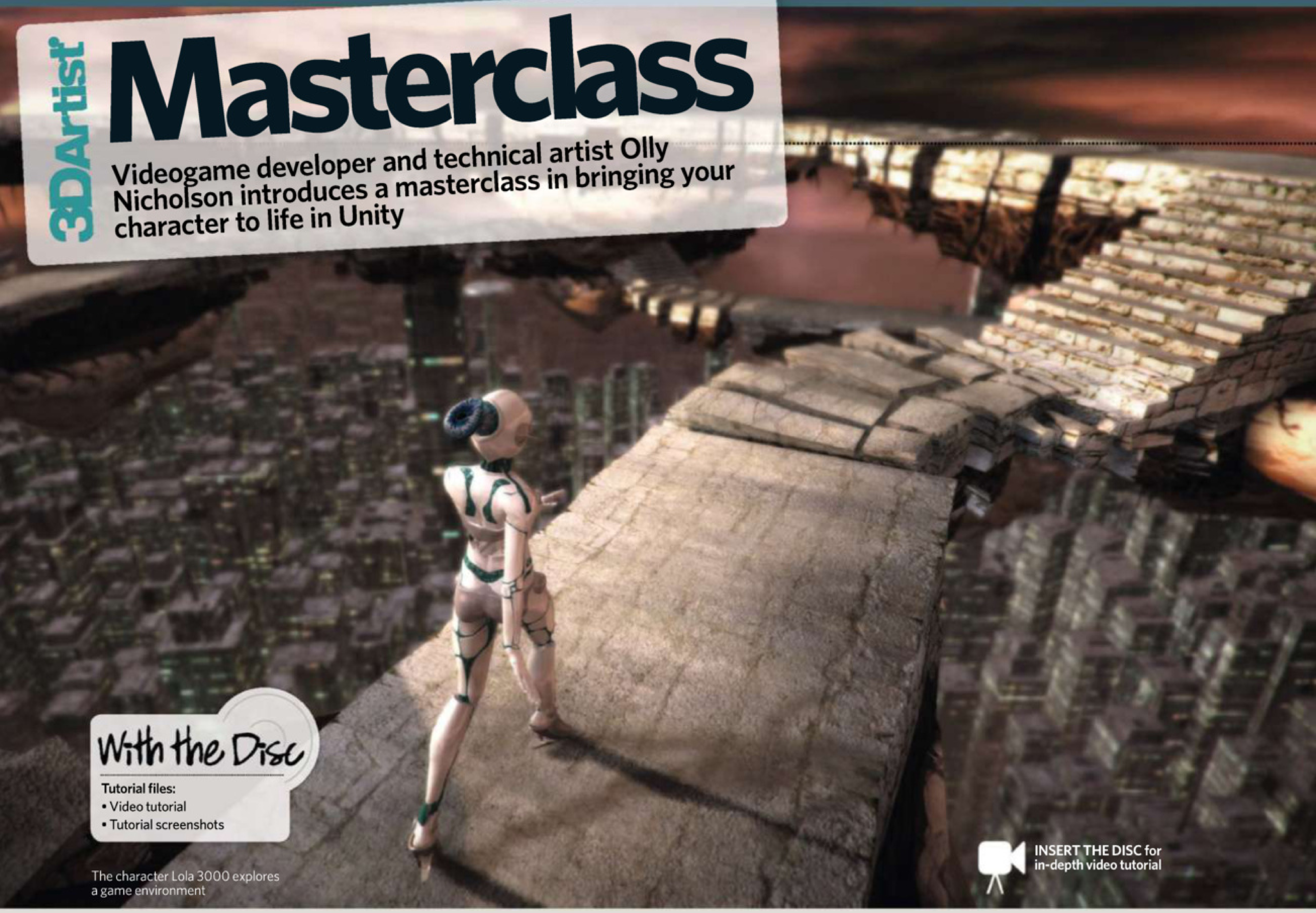
Kestutis Rinkevicius

Website www.kestas3d.com
Country Lithuania
Software used ZBrush, 3ds Max
Bio Kęstutis’s passion for CG stems from his childhood. Initially just a hobby, he now works as a full-time character artist

3DArtist

Masterclass

Videogame developer and technical artist Olly Nicholson introduces a masterclass in bringing your character to life in Unity



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- Tutorial screenshots

The character Lola 3000 explores a game environment

INSERT THE DISC for in-depth video tutorial

Create an interactive character in Unity

Olly Nicholson reveals how to set up your character with Mecanim

Do you like to just watch or do you like to play? Now that hardware and tools are up to the job of rendering 30 times a second instead of all night, more and more CG artists are searching for ways to interactively engage with their artwork and character creations. In short, more artists are looking to make games. Why stop with a rendered image or a video when you could play as your character and get inside your own worlds?

This tutorial is designed to run you through the steps of importing, animating and controlling your character as a player in Unity. By the end, you should have a great starting point for a game or an interactive demo featuring your work. This Masterclass is designed to be 3D package-neutral, so whether you use 3ds Max, Maya, Blender or any of the many supported modelling programs, you should find what you need to turn your character model into a player in your scene. Don't worry if you've not created any scenes though – there are plenty of environments and kits available either for free or paid on the Unity Asset Store. The Unity sample assets will provide all the animations needed for controlling the character and you can, of course, add your own.

We'll begin with the steps you can take to prepare and rig your character before adding BlendShapes, verifying and then importing your rigged file into Unity. We'll then set up some of the materials and shaders so that you can get your character looking its best. Next we will create an avatar to match your character rig and set it up for animation using a third-person controller with the Unity sample assets. We'll load in a custom animation and set up a BlendShape layer to further customise the character. We'll also add lights and effects to the environment for a real-time, post-processed finish. You will need an install of Unity – either free or the Pro version – and the sample assets, available for free from the Asset Store. All you need to do is obtain your Unity ID, download and get stuck in.

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Building your scene – workflow inside Unity

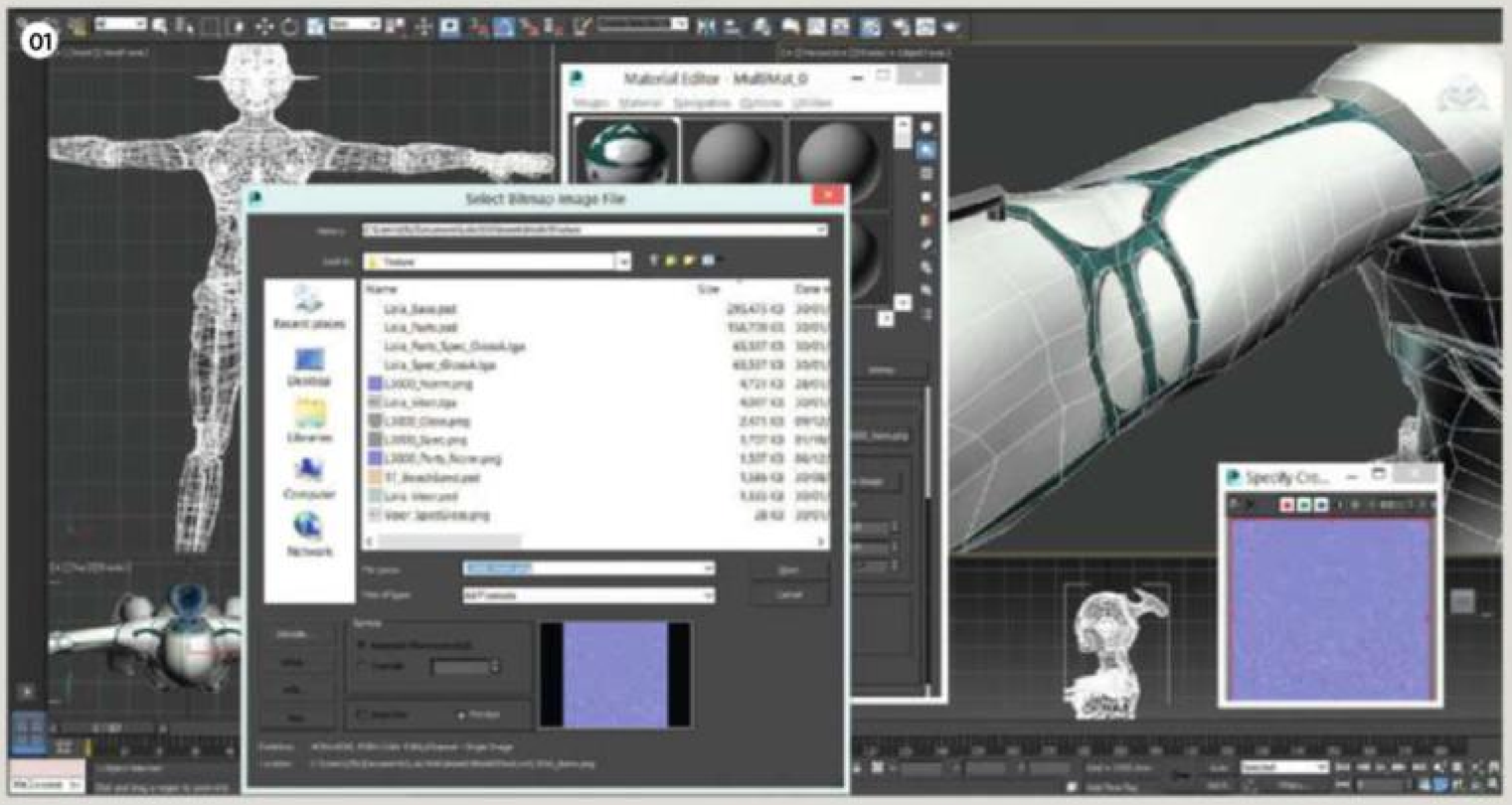
Step into the program – go from your character to an interactive player

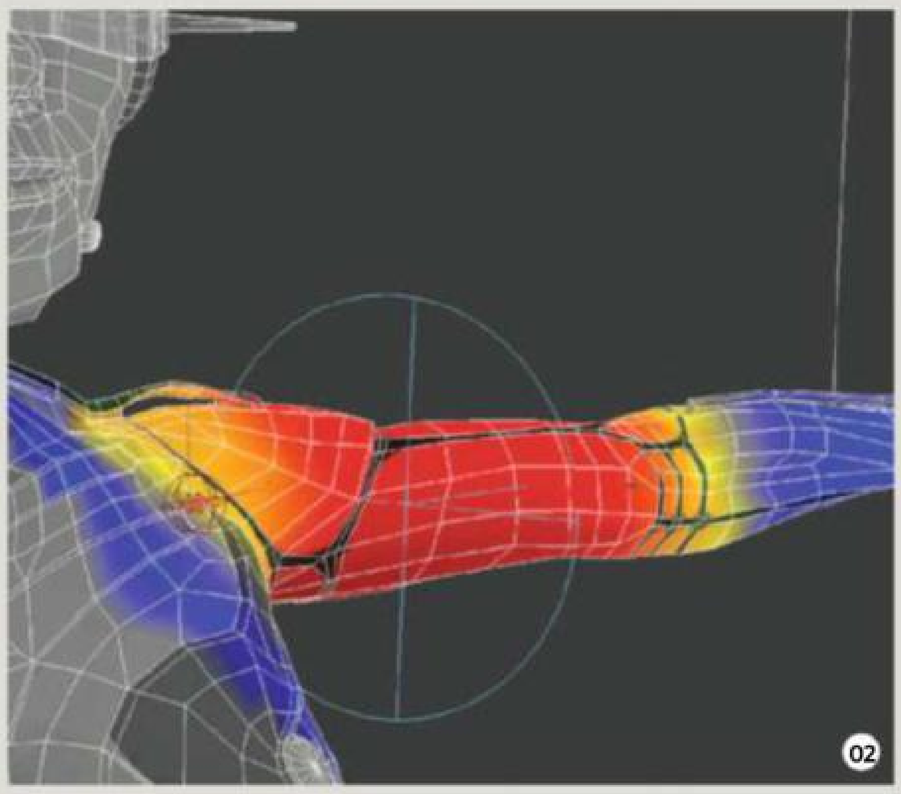
01 Prepare your model

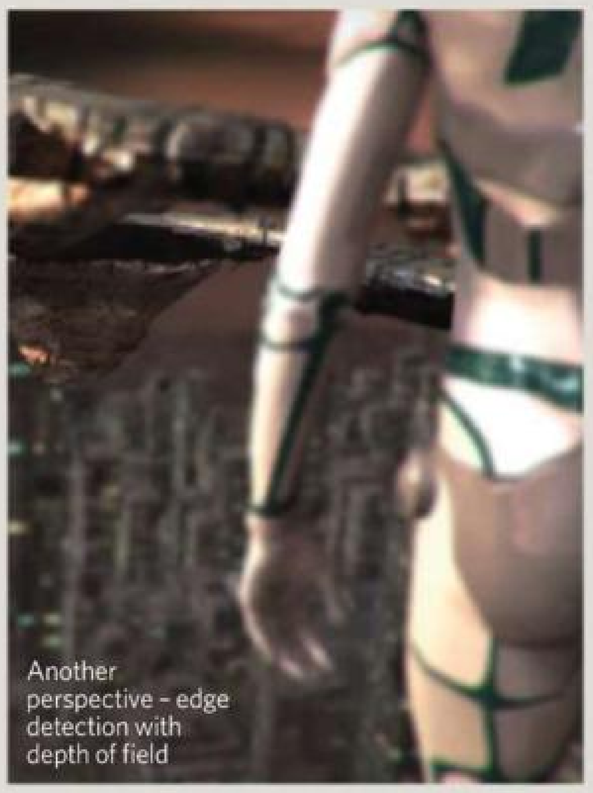
Unity is a real-time platform, so preparing your model without breaking the bank polygon-wise is an important step. Name your materials and textures sensibly and use normal maps for extra detail. There are no polygon limits, but the more you use, the less memory you have to use on effects, the environment and other characters. A good range to aim for is between 5-25,000 polygons, depending on platform, so try to reduce polygons with the tools in your 3D package where necessary. Place your textures in a folder called Textures within your Unity Assets folder and repath them before you export.

02 Rig your character

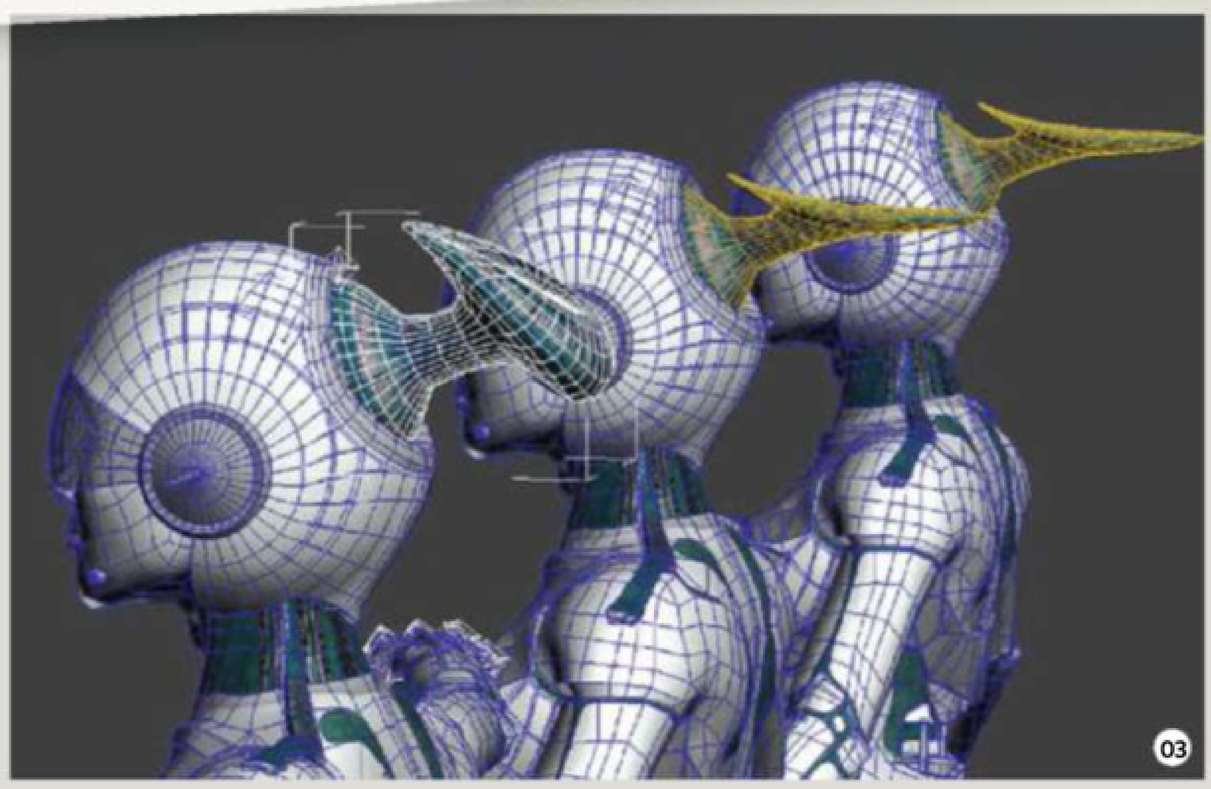
This stage will depend on your 3D package, skills and time available. Once your model is prepared in a T-pose, you can either create a bone hierarchy from scratch by using your 3D package's in-built tools to generate skin to a skeleton by assigning skin weights, or use a fully automated solution like Mixamo Autorigger. For example, in Maya you would use Human IK, while 3ds Max uses Biped/CAT along with the skin modifier and Blender relies on Rigify. For more information on preparing your own character, consult the Mecanim section of **http://docs.unity3d.com/Documentation/Manual** for a guide to the process.







Another perspective – edge detection with depth of field



03 Set-up BlendShapes

Unity supports BlendShapes, so decide which part of the character requires morphing and set it up in your package appropriately. This means using BlendShapes in Maya, Morpher in 3ds Max or Shape Keys in Blender. This is often used for phoneme shapes when animating a talking face and works by assigning morphed shapes of the same number of vertices (often a duplicate of the original) to a target. You can then blend between versions to obtain different shapes without animating a complex bone hierarchy.

04 Verify and export

This stage is important to minimise both errors and the need for troubleshooting when you set up your model later. Remove unused meshes and irrelevant assets like lights or cameras from your scene, or simply use the export selected if your 3D package allows it. Use the FBX file format if you can to enable file portability and simplicity. If you have your own animation clips, be sure to check the Animation check box in the Export dialogue. Reimporting your exported model into the 3D package is often a good way to verify your model before bringing it into Unity.

05 Import your model

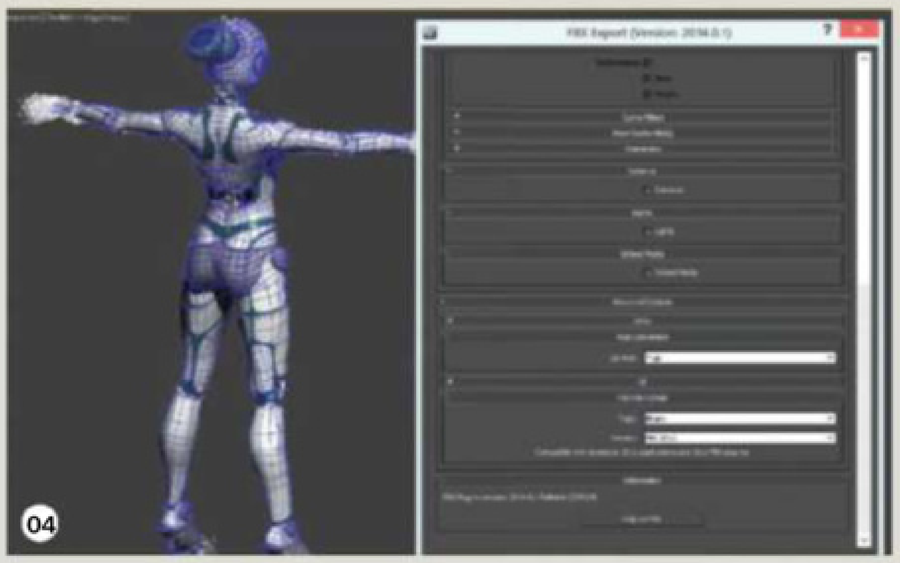
You can drag your FBX file into the Project pane, or if you exported here already, your model will be picked up automatically. You can select your model in the Project browser and set up the options in the Inspector panel. You should probably leave most of these as default, but check the Scale Factor as scale can vary hugely depending on units used in your 3D package and your export settings. Click Apply and drag the model into the scene. You can create a 1-metre cube to make sure the scale is correct, then adjust accordingly.

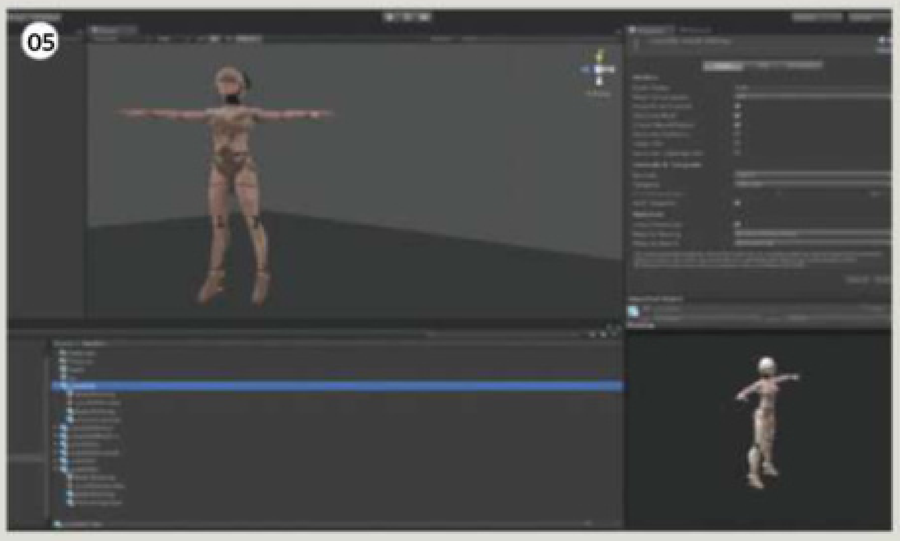
06 Prepare materials

Select your character in the scene and take a look at the associated materials in the Inspector – these should have been created in the Materials folder where your model is exported. Each material has a dropdown for a Shader. Choose one appropriately – such as Bumped Specular – so that you can define a base colour (tint), specular colour and the texture maps for the diffuse (Base RGB), gloss in the Alpha channel and a Normal map to add surface detail. Reflective materials can also have a cubemap assigned for reflections, which you can render once in the Unity editor or real-time for dynamic reflections.

07 Create an avatar

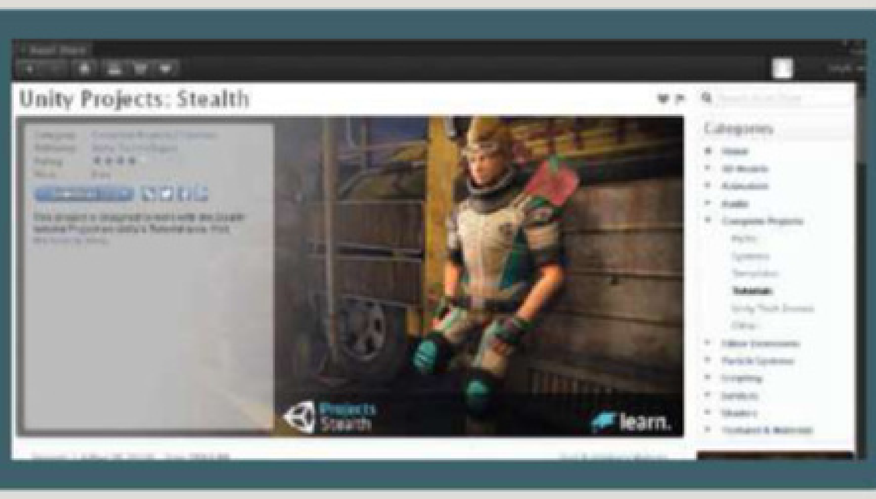
Once imported, your character model needs to have a Mecanim avatar applied. This will map your skeleton to an avatar to use with any humanoid animation. Select the character model FBX file in your Project pane, then select the Rig tab and choose Humanoid for Animation Type. Click Configure to create and configure. If your rig is good to go it will all show in green, otherwise assign bones to the correct slots or revisit your bone hierarchy and re-export to more closely match the avatar. You can test your skinning in the Muscles tab by dragging the sliders to preview. When you're finished, click Done.

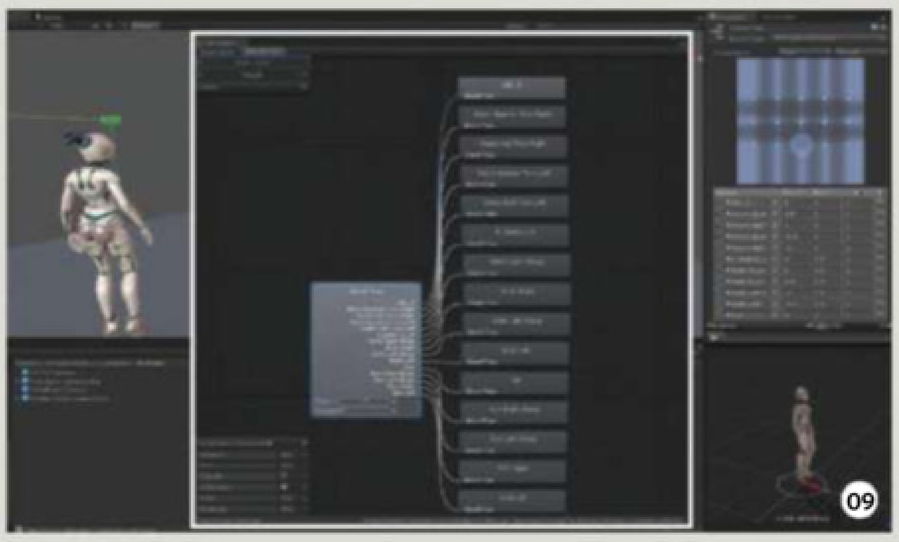




Unity Asset Store

As well as the sample assets needed for this Masterclass, you can browse and make use of a library of paid and free assets to work with your project. From scripts to shaders and animations to audio, you can download and contribute to the Unity Asset Store to add to the parts that other projects couldn't reach. Check it out at www.assetstore.unity3d.com.





08 Apply a controller

Unity sample assets provide all you need to control your player. From the Project window, drag the Third Person Character prefab from the Sample Assets>Characters and Vehicles>Third Person Controller> Prefabs folder into your scene. In your hierarchy delete the Ethan node underneath Third Person Character. Drag your Character node on top of the Third Person Character node, which already has all scripts and parameters assigned. From the Cameras>Prefabs folder, drag the Free Look camera rig into the scene, add and position a plane game object, and press Play.

09 Animate your character

If you have imported or acquired an animation from the store, you can replace the animations from the Character animator. Select your Character Root node and open the animator from the Window menu – this opens a pane that manages which state your character is in and therefore which animation will play. Double-click on Grounded State to open the Blend Tree for when your character is on the ground. Select the Blend Tree and in the Inspector click the little circle next to an animation to choose another. Press Play to preview then stop and make your adjustments as necessary.

10 Use BlendShapes and tweak your character

Create an animation in your source package which blends between two or more meshes, as outlined in the third step. Re-export your mesh and include Animation>Morphs in the FBX dialogue. In Unity create a new layer in your animator window and set Blending to Additive and Weight to 1, then drag in your clip from the Project window. Create an empty state and Ctrl/Right-click>Make Transition and transition to and from the clip. Set a Condition with Forward set to Greater than 0.5 for the To transition, and Forward set to Less than 0.5 for the From transition.

11 Add environment, lights and settings

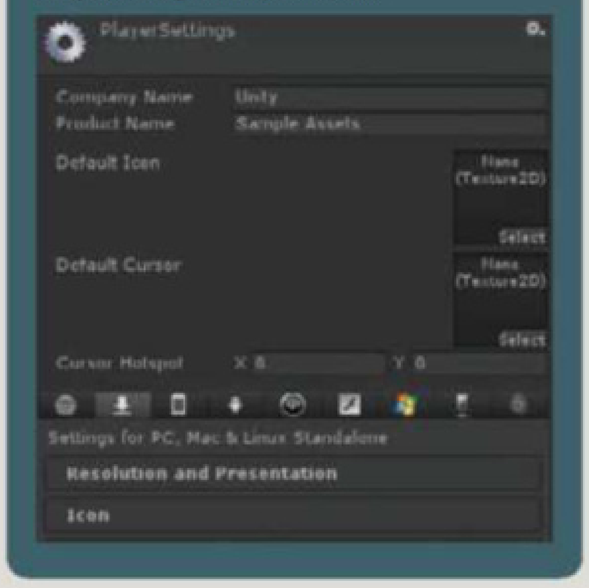
To immerse yourself in the game, you can add other primitives to your plane to create a greybox environment, import your own environment artwork, or obtain free or paid environments and props from the Asset Store to play about with. Any imported artwork needs to have Generate Colliders checked and applied in the Inspector for the imported file in the Project view, so that your character can walk on the surface. Create a directional light from the Create button at the top of the hierarchy and adjust the parameters in the Inspector.

12 Polish with image effects

Unity Pro includes a number of image effects that can help improve the look of your scene. Separate the Game view by dragging the tab out to preview. Select the Main Camera node under the Free Look Camera Rig. In the Inspector click Add Component>Image Effects>Camera> Depth Of Field – this means that you can retain focus on your character, but blur the background akin to a wide aperture in photography. You can add as many others as your frame rate can handle, so try out a vignette, bloom or ambient occlusion. Go ahead and immerse yourself in the game!

Export your project

Once you're ready, you can output your project to a wide variety of platforms. Out of the box, Unity Free can export to PC, Mac, Linux, Web browser, iOS and Android. There are optimisation considerations for each, but Unity makes it easy to manage these all within one project – as the tag line goes, build once, deploy anywhere. For further documentation and resources, take a look at the corresponding blog at http://blogs.unity3d.com.



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Tutorial files:
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Bring your characters to life with a dynamic spell-casting animation

Spell-casting animations for games

"Learn new techniques for videogame animations by following this quick and simple workflow for fantasy characters"

Taking on a game animation is a challenging task and there are many things that need to be considered. In this article you will learn some of the most important steps involved in animating a body mechanics shot, with an emphasis on game use.

This article will cover the process for a character casting a spell, similar to what you might see in an MMO game. The animation needs to be not only entertaining, but also practical. The frame budget we are going to be working with is 170 frames, which is a generous amount for what you would typically see in a game animation. When spending these 170 frames you need to consider things such as the player's situation in the game – if this character is going to be casting a spell, during that time the player will be vulnerable to the AI. As such, you need to make your animation quick and simple enough so that the player can get back to their attack stance quickly.

You can follow this article by using the tutorial files included with the issue. These will provide you access to the character rig, as well as all the scene files, the video reference and the final animation.

Become the character

If you really want to get into your character then create a back story for them. How old are they? What type of spell-caster are they? Are they evil or good? These types of questions can help you add more colour and personality to the way they move.

Bring your character to life

01 Shoot reference and create the character

As with any animation, one of the most important steps is to first shoot a video reference. You don't need a high-tech camera for this – something as simple as a mobile phone will do just fine. When shooting the video reference, you want to act out the move as many times as possible to explore different ideas and play around. The chances are, no one will ever see your video reference, so break into the character of a wizard or mage. How would they act? Is your character older or younger? Not many people get the chance to act like a wizard, so have fun with it and get some inspiration from your favourite films.

01

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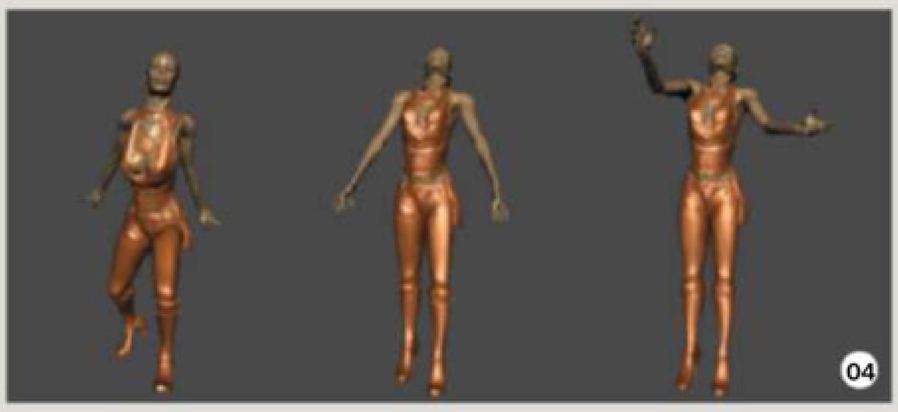


04

02 Sketch thumbnails

The sketches used for this specific animation were very rough pose ideas. Yours don't need to be anything special, just a few quick and easy ideas sketched out on paper. Pull up your video reference to get some pose ideas to jot down. It's worth seeing how you can exaggerate them on paper to increase the appeal and the line of action. At this point it might also be worth marking down timing ideas next to each pose so it's easier to time it out once you get into your chosen 3D application. Like before, look at your references to build up a thorough understanding of the type of timing that you want to achieve in your animation. Chances are you will need to adjust it once you get into blocking, but it's a great place to start.

03 Block in the key poses

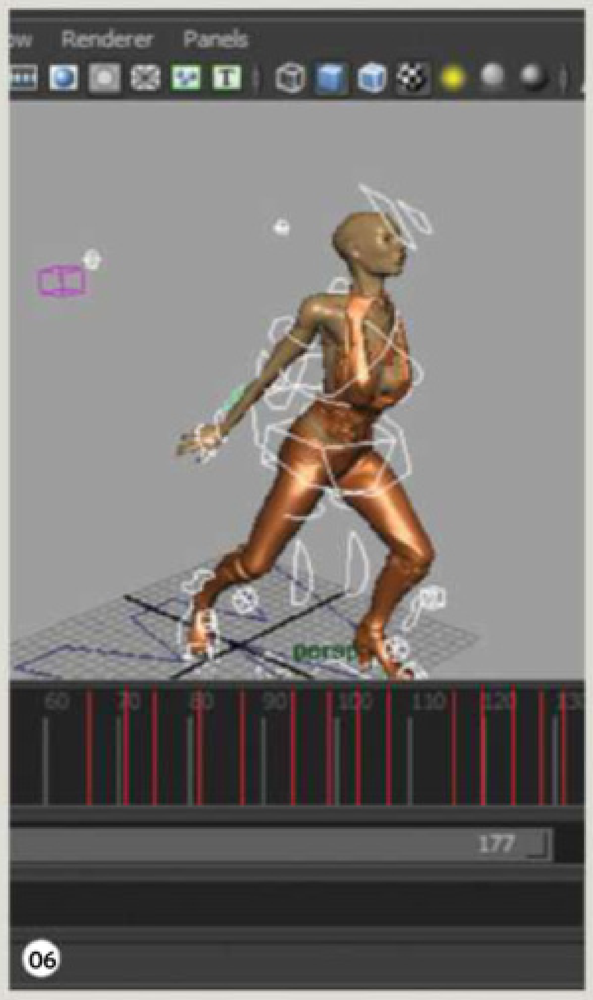
For this blocking pass there are just sixteen key poses that were created. That was all that was needed in order to be able to properly tell the story, while still staying simple enough to keep the animation manageable. The timing used for this was based solely on the timing in the video reference. Since this is a type of animation that would be used for a game, there are two shot cams established in the scene, the first one being a perspective camera, and the other being a game camera, which is a view that would typically be used in an MMO or RPG. Remember that in a game your animation is probably going to be seen from all angles, so it needs to work well from any of them. Take a look at the tutorial files to see the blocking pass.

04 Add the breakdowns

The breakdowns are vital for not only explaining how the character is getting from one key pose to the other, but also the spacing for each action. The files on the accompanying disc will show the placement and timings for each breakdown. A more generic placement of these breakdowns is smack in the middle of two key poses, which is not really incorrect but to be able to have more control over your animation and not let the computer take over, you need to think more logically with your breakdowns. Is the character going to slow into the next key pose, or slow out? Making those choices early on in your breakdown pass will give you much more control over how your final animation looks.

Back to basics

05



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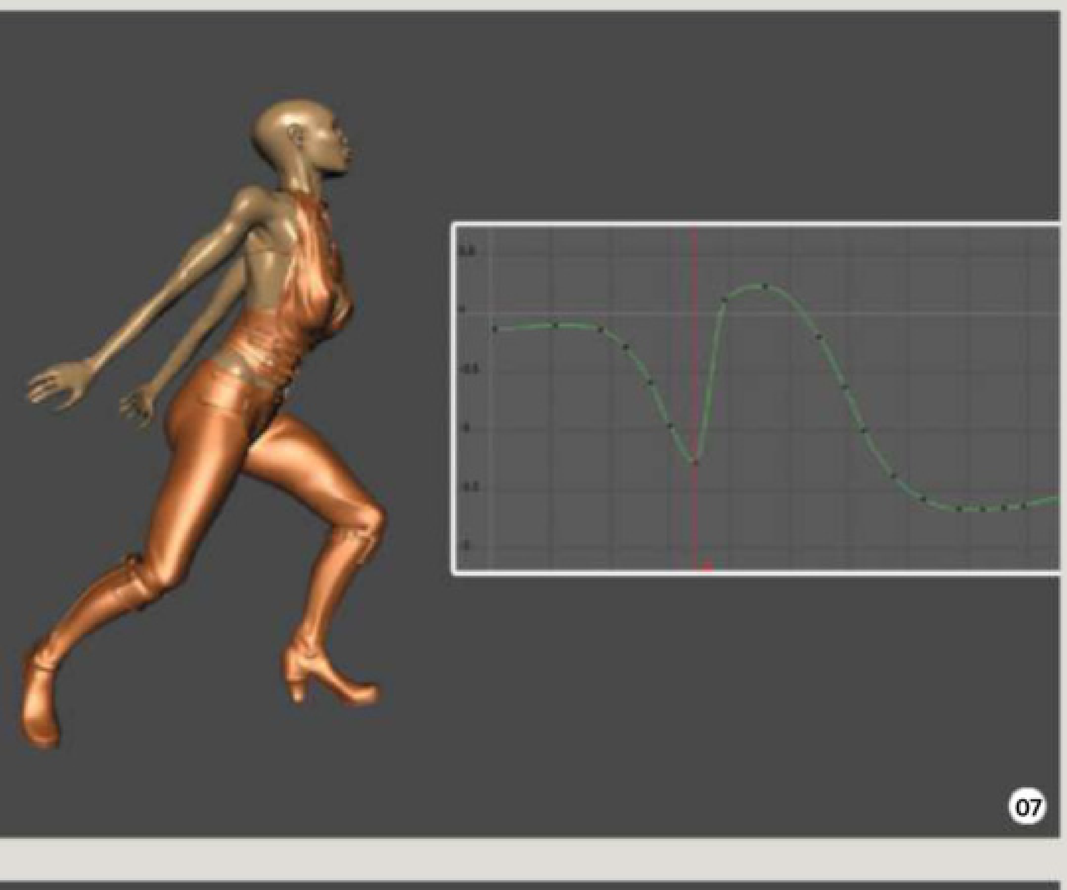

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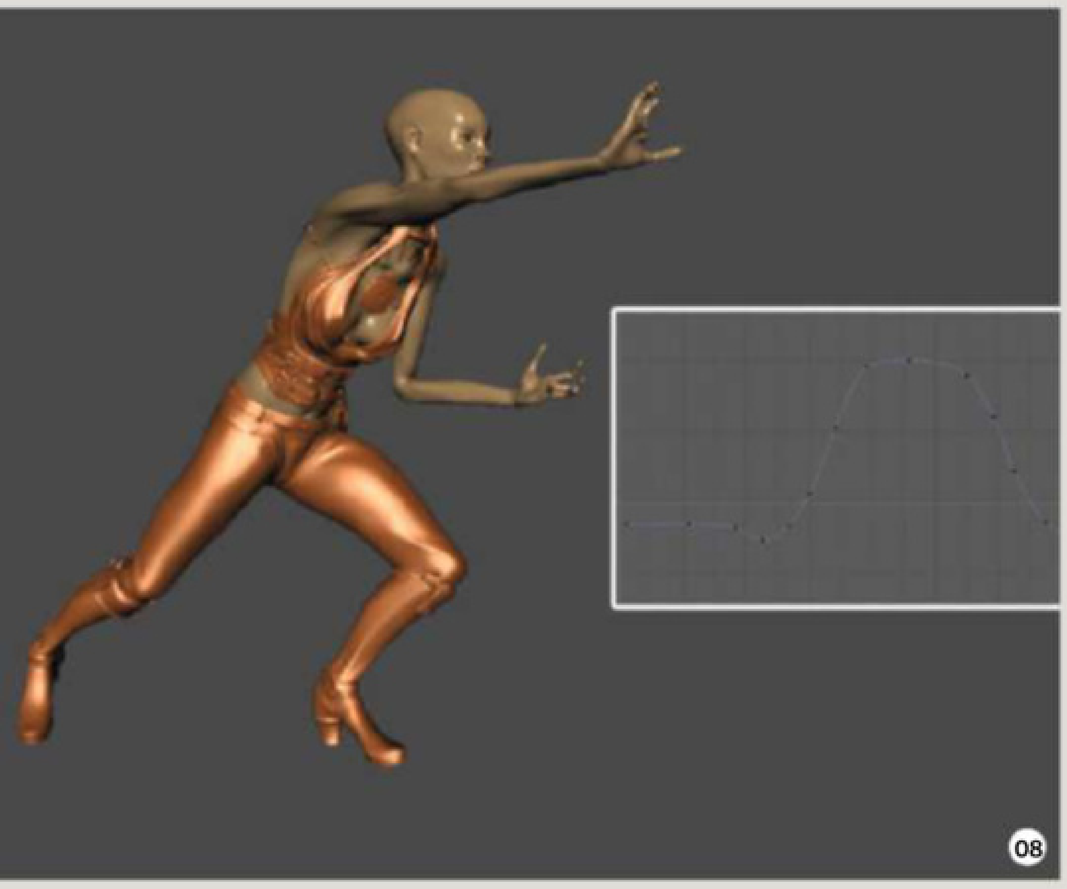

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05 Convert the breakdown pass into a curve

Up until this point the animation has been in Stepped mode. Since this animation is focused on body mechanics, it is often easier to work in Stepped mode all the way through the breakdown pass. Now that the breakdowns are in, you can convert your keys into an interpolated curve. In this case we've used the Auto Tangent type. It can be scary when you hit that Convert button, but if you've put enough information into your breakdown pass you shouldn't run into too many surprises. You can spend this time tweaking the curves – always remember to start with the centre of gravity control. If you run into gimbal lock you can fix it easily with the Euler Filter. If you need more information, this step is covered in the tutorial files supplied on the disc.

06 Rearrange the timing

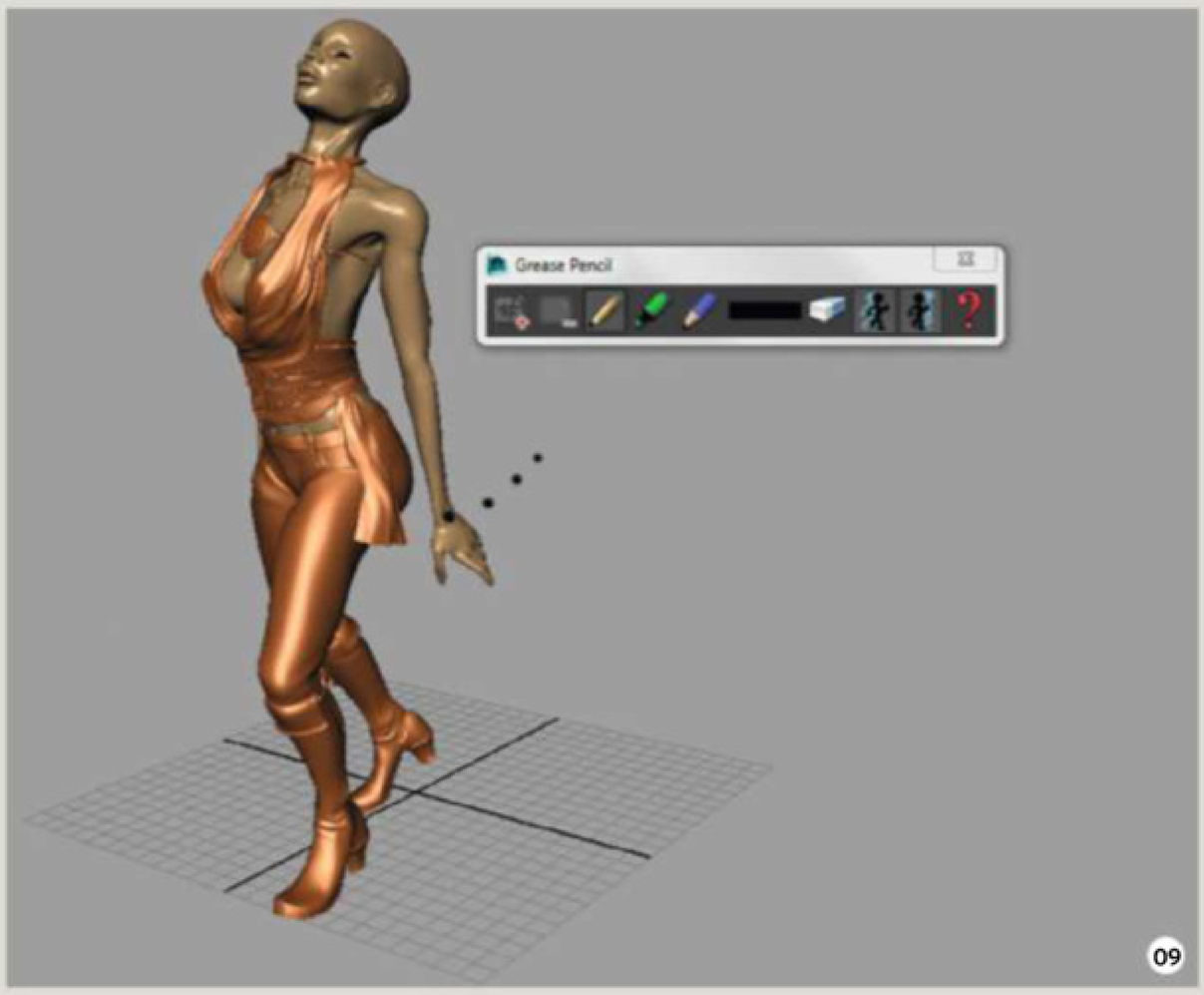
Now that the animation has been converted from stepped tangents into curves, you may start to see that your timing isn't working in certain areas. Up until this point the timing has been based on the video reference that was created earlier and, while it may look great in your reference, it doesn't always mean that the timing will work in the actual animation. In our animation we've tweaked the timing so that it flows a little better. The pose when her arms are raised has been held a for few frames longer and the timing for when she gets into the crouched position has been sped up quite a bit to make it seem more natural. Since no more extra poses have been added before this process, it's still very easy to adjust the timing.

07 Adjust Translate Y

At this point, there are likely to be a few hiccups in the spacing for the centre of gravity control. Let's first focus on Translate Y – the up and down motion. There are two major areas where the spacing for the up and down movement is critical, the first being the dip down. When she comes down, the spacing needs to be spread out at the bottom of the arc, but the opposite needs to happen when she pushes herself up. The spacing needs to be tighter at the beginning of the arc and spread out at the top, because she is pushing off with her leg and needs to build up that force. The second area is during the slight jump back at the end – the spacing for this needs to be tighter at the top and spread out when her weight starts to fall, the same way you would animate a bouncing ball. This ensures that her weight is correct.

08 Adjust Translate Z

Another critical area that you need to adjust is the Translate Z for the centre of gravity control. This controls the forward motion of the character. This needs to be a very smooth curve. Play your animation frame-by-frame and take a close look at her hips – make sure that there are no places where the hips come to a stop during her forward movements. In our case, when she lunged forward the hips came to a stop for several frames, which caused a very jerky movement into that push forward. An easy way to fix this is just to make sure that the Translate Z curve is smooth and that there are no inconsistent values. Check the accompanying tutorial files to see a more detailed example of this.



09

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09 Track the travelling arcs for the arms

A lot of the movement that is happening is in the arms. Because of this, you need to make sure that they are travelling in smooth arcing motions. As this is where the spell is being cast from, there should be no jerking movements or inconsistent arcs because they will stick out like a sore thumb. A great way to track the arcs for your arms is to use the Grease Pencil tool inside Maya. Or, if you want to take more of a do-it-yourself approach and have an appropriate monitor, you may even be able to use a dry erase marker pen to track the arcs directly on your screen.

10 Use lead and follow and include drag

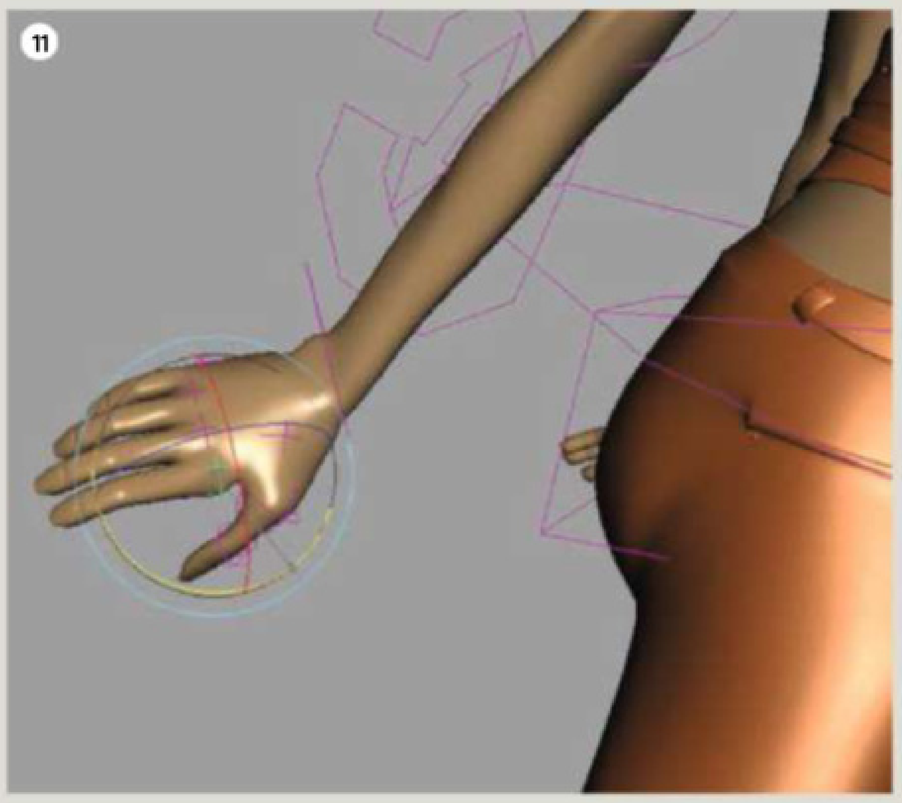
At this point in the animation it may feel like everything is happening all at once, as if the body is moving as one unit, so you need to break up the movements a little bit. Start incorporating lead and follow into the animation. For example, when the arm moves, have the shoulder move one frame ahead. This will add a touch of believability to the animation. The same goes for the elbow – have it start to move after the arm has moved. You can also start to add in drag in various places. For example, have the head drag a few frames behind the rest of the body's movement.

11 Polish the final character

The last step is to add the finishing touches and final polishes to the character to make her much more realistic. Track all of the arcs, not just for the arms, but the feet, head and so on. Adjust any spacing and make sure your graph editor is cleaned up. At this point the animation is completely fleshed out, so don't be afraid to add in any extra keyframes. In our animation there has been quite a bit of polish done to the hands and fingers. Up until this point they've stayed in relatively the same position throughout the animation. This is demonstrated in the tutorial files.

12 Add a simple particle effect to the animation

What is a spell-cast without a spell? To really sell the animation, we are going to add a very simple particle effect. If this animation were to be used for a game, it would most likely be done in the game engine. In this case we will create one in Maya. You can use a simple Polygon Sphere and apply a Fire effect to it in your Dynamics menu. Using the default settings for the fire, it will create a really cool-looking fireball effect. Once you hide the Sphere, you will have just the fireball – play around with the settings if you are trying to get a different result. Once you are happy with how the fireball looks you can now animate the fireball yourself to make it emanate out from between her hands. The final animation is available on the disc.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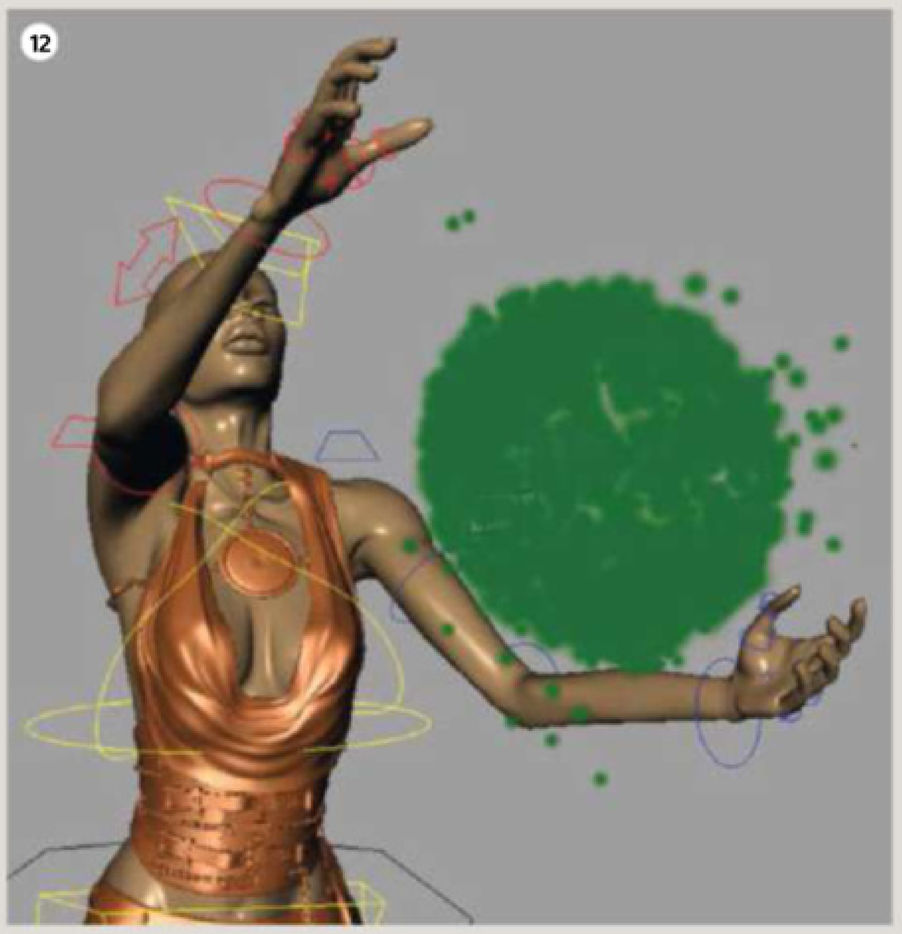
12

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Ângelo Fernandes
www.angelofernandes.com

Ângelo Fernandes is a freelance 3D artist who works mainly with architects and interior designers on arch-vis scenes. He also creates product renderings for design agencies.

Maya/mental ray
Aldo Vicente
www.aldovicentecg.wordpress.com

Aldo Vicente works both as a freelance 3D artist and for advertising agencies. His tutorial focuses on introducing the benefits of using a linear workflow in Maya.

With the Disc
Tutorial files:
• Tutorial screenshots

3ds Max

6 tips for faster arch-vis scenes

How can I speed up the process of creating an arch-vis scene in 3ds Max?

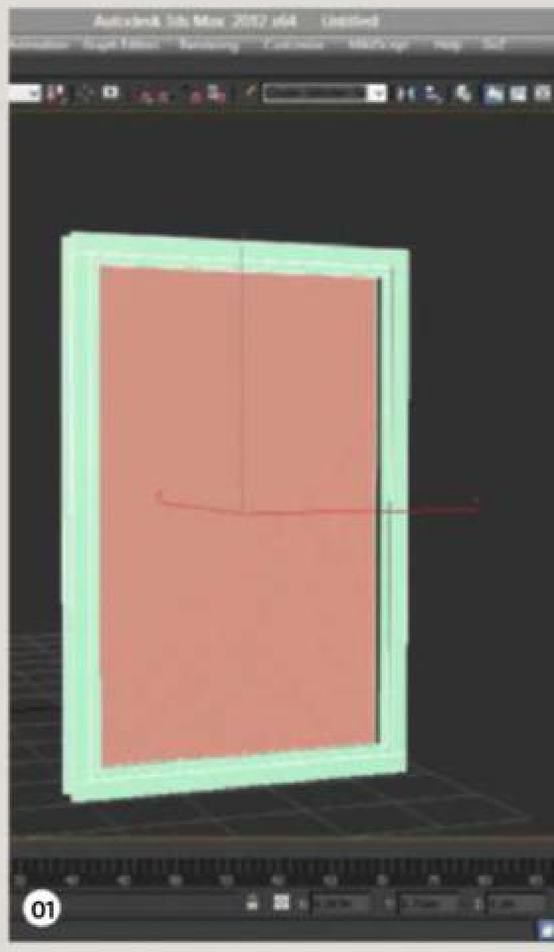
Constructing a realistic arch-vis image can be a long and arduous process, often taking longer than you may have anticipated. As such, every technique that helps to shorten the overall time spent on a project is more than welcome to our workflow, especially when working to deadlines.

One thing I learned very early in my career is that there are many ways to achieve a quality arch-vis result and no single method that could be described as the best. It is very much advised to go beyond what you may have been taught by others and to improvise, creating techniques and processes that work best for you. After all, sometimes what may be flaunted as the correct approach is not actually the best way to resolve a specific problem – often a certain skill might work in one scenario but not in another. So, it's very useful to test and practice several different techniques.

For example, when I first started out in the CG field, my objects would usually have a final TurboSmooth modifier applied, which would require me to create an extra set of edges in order to guarantee smooth lines on those models. On complex objects this would take a considerable amount of time to get just right. This was a problem until I started using a Chamfer modifier. Using this tool, the overall result is the same but is more easily achieved, especially when it comes to simpler objects such as doors and windows. As clients usually have short deadlines and tend to ask for various alterations, you really can't afford to waste time by employing slow techniques.

Before we get stuck into more tips like these, one bit of advice I would like to impart is to not start modelling right away. Before you start working, take a moment and plan what you're going to do. I've learned from experience that planning is a crucial part of the process as it saves you time and helps you to avoid mistakes further down the line. This goes for a single object or for an entire project. Think about what the best strategy might be to build that model and you'll find ways to avoid the kind of trial and error situations that can take up a majority of your creation time.

Unfortunately some 3D artists tend to overlook a lot of techniques that can help them, so hopefully by integrating the following tips into your workflow, you will be able to achieve faster and better results on your arch-vis projects.



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Maya

Michael Levine
www.michael-levine.com

Michael has worked in the VFX and animation business for over 16 years. He specialises in character hair and cloth simulation and has worked for Disney, ILM, Sony and others.

Maya/Arnold

Sari Rodrig
www.sarirodrig.blogspot.co.uk

Sari Rodrig is an award-winning filmmaker and 3D artist. Her speciality is primarily in shading and her tutorial explains how to build shading networks in Arnold.

Send us all of your 3D problems and we'll get them sorted. There are four methods to get in touch with our team of expert advisors...

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01 Assign Material IDs

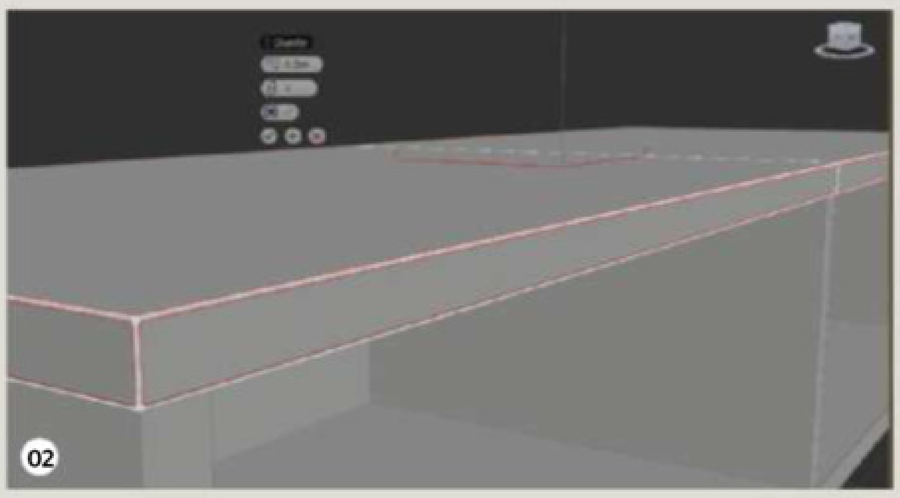
Material IDs are incredibly useful when modelling objects that are made up of different materials. For example, if you're making a window, you know that you've got to consider the frame, the rubber gasket and the glass. You can define what ID matches each material and with a Multi/Sub-Object you can easily apply all the corresponding materials. To assign an ID, add an Edit Poly modifier and choose Polygon from the Selection tab. Select the faces you need and apply the ID Number you want on the Polygon>Materials IDs tab. Afterwards, whenever you need to highlight that ID you will only need to write the ID Number on the box and press Select ID.

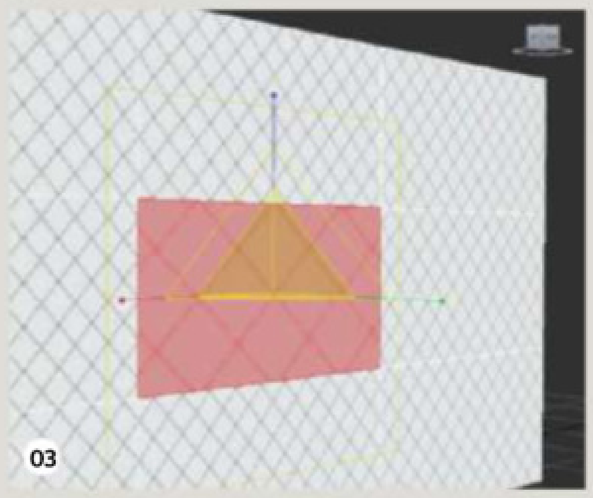
02 Use Chamfer or TurboSmooth

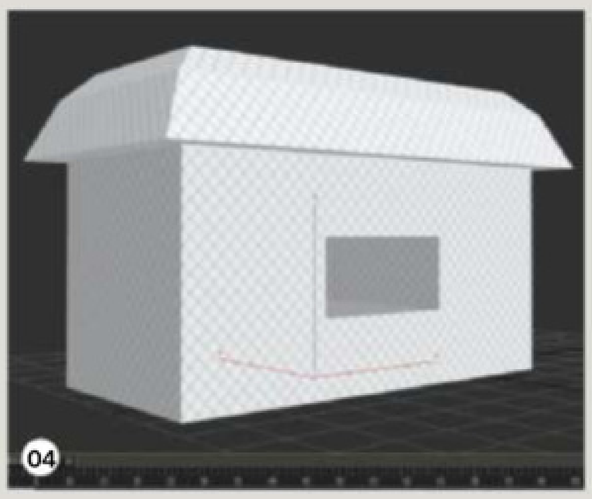
The TurboSmooth modifier enables you to create smooth edges and is especially useful when it comes to achieving convincing reflections. However, not all objects need it. Simple objects such as doors, windows, counters and so on can get smooth edges using the Chamfer modifier. Add an Edit Poly modifier and select Edge on the Selection tab. Next, pick all the Edges on its margins (the ones that limit the model). All others, if there, are left unselected. Go to the Edit Edges tab and press Chamfer options. Insert two or three millimetres and three Connect Edges Segments. This will do the same job as the TurboSmooth modifier and is much simpler and easier to achieve.

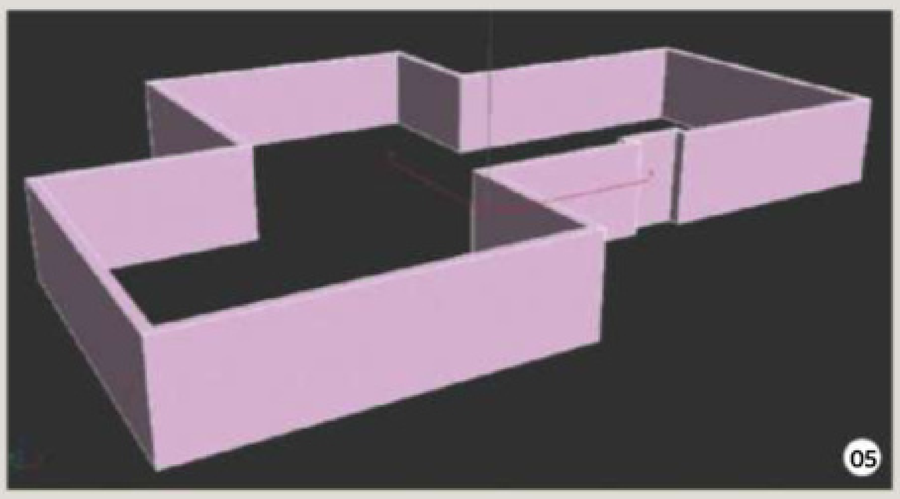
03 Create UVW Map

The UVW Map modifier is perfect for applying textures to objects such as tables, shelves and so on. This avoids having to unwrap the UVWs and make a map from scratch. After applying the texture on the material, add a UVW Map modifier and choose Box on the Parameters tab. Next, press Bitmap Fit and select the map you have applied. Now choose Gizmo and you can move, resize or rotate the map easily. You can repeat this process with polygons. Just add an Edit Poly, select the ones you want and, with those polygons highlighted, add another UVW map. You now control the map of those polygons exclusively.









04 Substitute modifiers for layers

Even if you have a planned strategy, modelling an object can be tricky. As such, when I'm creating a complex object, I like to add multiple Edit Polys to the model. Adding a new Edit Poly when you're about to perform a big change can save you a lot of time if you have to undo the entire step. Just add an Edit Poly, rename it for better organisation and perform the next operation. This is similar to layers in Photoshop – you can turn them off to see what you have done and delete a part if you need to.

05 Build with Splines and Sweep

With a Spline Line and Sweep modifier it's easy to build rooms and architectural details like shelves, window frames or even an entire window. To build a room, select the Top view on the viewport, draw it with a Spline and then add a Sweep modifier. The default Sweep shape is Angle so you'll need to change it to Bar. On the Sweep Parameters tab, go to Pivot Alignment and set the right option so the walls don't go up and down simultaneously. On the Parameters tab you can set the height and width of the walls.

06 Work with proper scale and proportion

This may seem obvious, but having an object off-scale can ruin an entire scene, even if it's only a chair. Other problems can crop up as well – maybe the floor's texture is an abnormal size. Our eyes are accustomed to noticing issues such as this, so you need to use real measurements for everything. Go to Customize>Units Setup and set your units. I advise using centimetres for interior spaces and metres for exterior scenes. Having a measuring tape can help when making sure you have the right measurement for a particular object.

References and constant practice

To create an interesting architectural visualisation, it's important to have as many references as possible. There are many websites dedicated to interior design and architecture, so it's useful to follow these sites and to gather a library of references to refer to. If you keep practicing everything, from modelling a simple chair through to an entire house along with its contents, you'll inevitably start to pick up your own tricks and techniques, which will help you to achieve better results.

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Tutorial files:
- A linear workflow reference chart
- Tutorial screenshots

Maya, mental ray

An intro to linear workflows

"What is a linear workflow and how do you set one up in Maya?"

A linear workflow is a method of Color Management developed to solve one major problem – our monitors don't know how to correctly display the renders that Maya produces. This means that the rendered image as we see it on our monitor is not accurate to what we've created. When we use a linear workflow it means we are adjusting the way that Maya manages and corrects colours to ensure that when we render, we see a truly correct image on our monitor with the highest level of lighting accuracy, detail and realism. Linear workflows can get a bit convoluted, so here we'll simplify it all down to the key aspects that are relevant to the 3D artist.

We can think of a Color Profile like a language of numbers meant to represent colours. Maya uses a Linear Color Profile, while monitors use sRGB. In order to translate colour information from one to the other, we need to apply a particular gamma correction. sRGB images are already encoded with this gamma correction, but Maya's linear renders are not. Therefore, when we render from Maya and view the image on our monitor, the colours we see are actually not the colours Maya has produced. Instead what we see is the monitor's misinterpretation of the image. A lot of the amazing visual information that Maya calculates based on the lights, colour values and textures in our scene simply gets lost in translation. Monitors typically end up displaying these images with an unrealistically steep light decay that makes them appear darker and more contrasted than they actually are.

Artists will often mistakenly compensate for these effects by intensifying the lights and colours in their scene, unknowingly making their scene unrealistically bright to offset a display that is incorrectly dark. While this kind of counter-correction may produce usable results, it's ultimately limiting the level of accuracy and visual quality of our renders. The better solution is through using Color Management alongside a linear workflow.

Here we'll cover how to establish a linear workflow, starting with how to set up Maya's built-in Color Management system and how to view our renders accurately with gamma correction. We'll cover how to correctly incorporate Color Swatches and image textures into our linear workflow. We'll also discuss render output settings and compositing with linear images.

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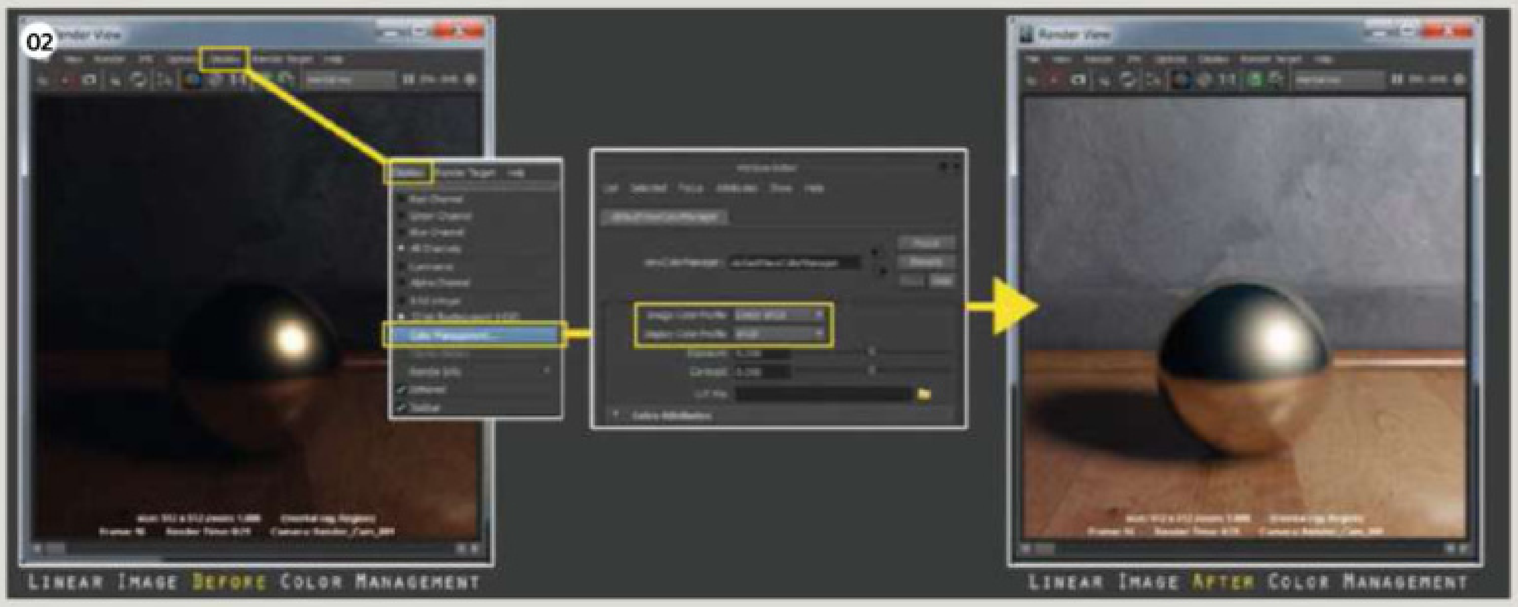
01 Use mental ray to enable Color Management

mental ray has a system that makes it easier to establish a linear workflow. Let's open our Render Settings and set Render>mental ray. Next, we'll enable Color Management in the Common tab. The Input and Output Profile settings refer to colour space. The Default Input Profile lets us tell Maya how to read incoming texture files (we'll discuss this in more detail later on). The Default Output Profile lets us tell Maya how to write our outgoing renders. Let's tell Maya to read our incoming textures as sRGB images, and to output renders as Linear sRGB.



02 Correct gamma in the Render view

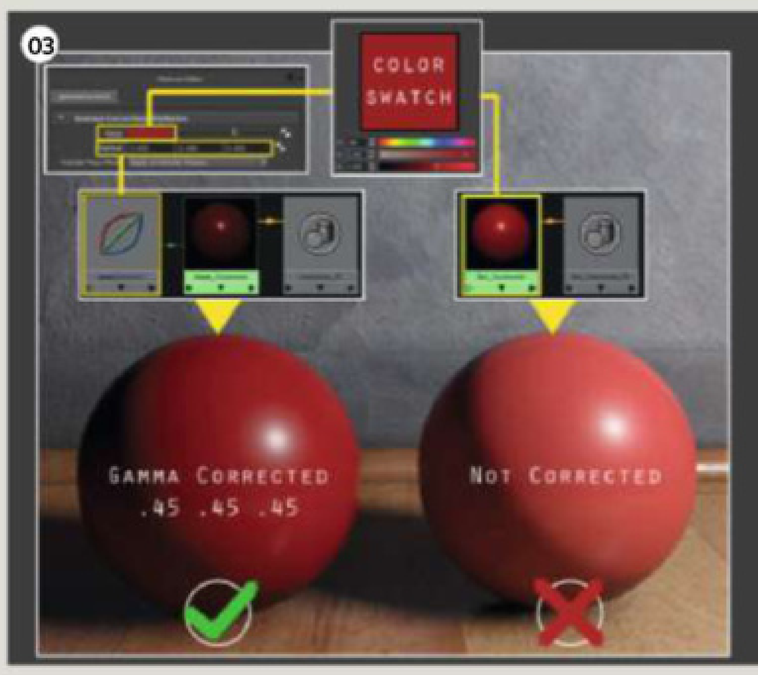
Our scene is set to output in a Linear Profile, so that when we render, our monitor will give us incorrect feedback in the Render view. To correct this, we need to tell Maya to colour manage our image so that it is displayed in an sRGB Profile. Go to Display>Color Management. The defaultViewColorManager will appear in the Attribute editor and it's here that we will be able to tell Maya that our image's Color Profile is Linear and that we want it to display as sRGB instead. Immediately we will see the gamma corrected image displayed in the Render view window.

03 Plug in nodes to the Color Swatches

When gamma correction is applied to the entire image, a new problem arises – our Color Swatches no longer look like they did when we picked them in Maya. The solution is to apply the inverse gamma correction to our Swatch. In Hypershade, under Maya/Utilities, let's create a Gamma Correct node and plug it into our Color Swatch. In the Node attributes we'll use the Value swatch to select our desired colour. Next, we'll set Gamma values to 0.45 – the inverse value of the correction applied at render. The two corrections offset each other, leaving us with the exact colour we've set in the Gamma Correct node.

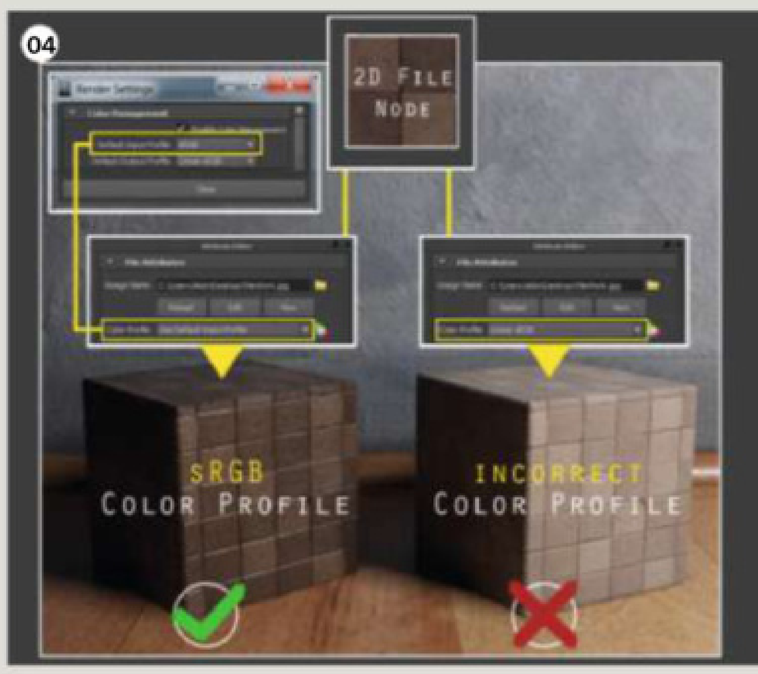
04 Assign a Color Profile to texture files

Most texture file types have an sRGB Color Profile and are already gamma encoded for display on a monitor. Therefore, just like Color Swatches, when gamma correction is applied to the entire render, colour textures appear incorrect. It's a good thing we set the Default Input Profile as sRGB in the first step. This tells Maya to assume automatically that all incoming texture files have an sRGB Color Profile. Maya will automatically colour manage incoming textures accordingly, ensuring colour textures render correctly. However, non-colour textures, like Bump and Displacement maps, should be treated differently. See 'Non-colour textures' for more information.



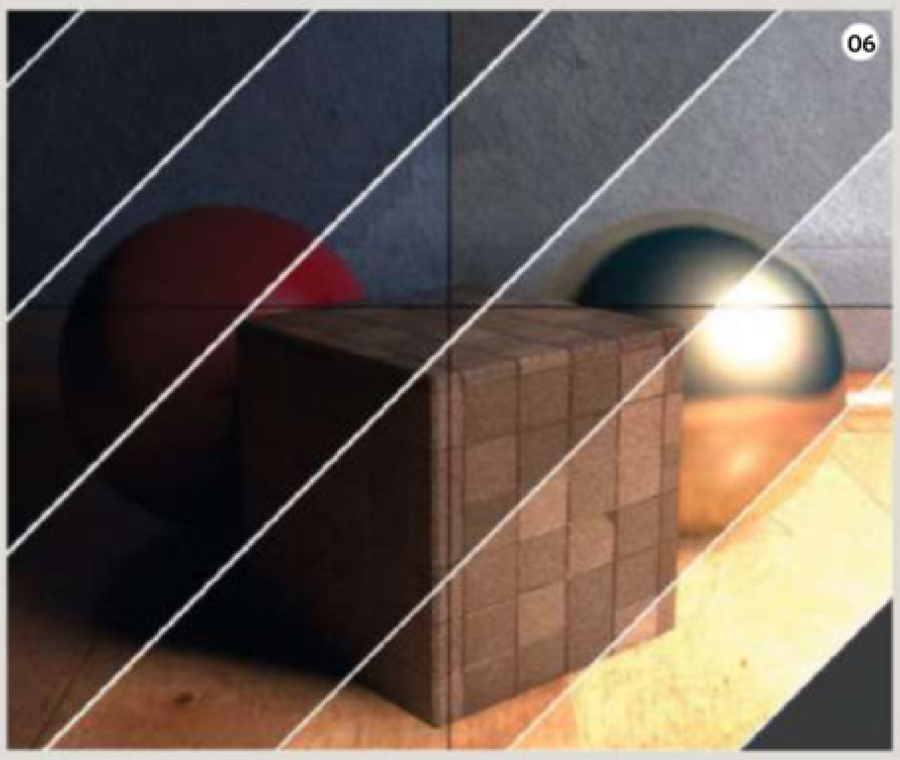
05 Export corrected images

Our Default Output Profile is set to Linear sRGB, so Maya is rendering in a linear colour space. However, in order to export our render as an image file with the full data of a linear image, we need to select a 32-bit image type that can actually support that level of data. To do this, let's start in Quality>Framebuffer, then set the Data Type to RGBA (Float) 4x32 Bit. Next, in the Common tab of the Render Settings, we need to set the image format as either an HDR or OpenEXR image type. Finally, batch render.



06 Compositing with a linear workflow

Put very simply, linear images contain so much more information than any sRGB image ever could, so they can be manipulated to a far greater extent with much more control when compositing. Typically, compositing software like Photoshop will recognise a 32-bit sRGB image with the proper gamma curve. If we're not compositing and we want our render to be the final image, I recommend setting the Default Output Profile as sRGB and using a standard sRGB image type. This way, our image is still colour managed, but it will export with the encoded gamma correction directly out of Maya.



Non-colour textures

Some textures are better off without gamma correction. For non-colour textures such as Bump, Normal and Displacement, pre-render gamma correction is not necessary or desired because it washes out their values. In the Attribute editor, we should set the Color Profile for these types of textures as Linear sRGB rather than sRGB via the Default Input Profile.

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Marvelous Designer was used to create the robe

With the Disc

Tutorial files:
- Maya scene file
- Tutorial screenshots

Maya

Tailor a robe with nCloth

ESTIMATED TIME TO COMPLETE THE TUTORIAL

1 HOUR

"How can I get folds and creases to drape correctly on a long robe?"

Tailoring is a crucial step in determining the look of a character. A perfectly untucked shirt, flowing capes or dirty robe can be key elements in defining their personality and visual silhouette. However, instead of a sewing machine, you'll be using nCloth constraints and painted maps to tailor your character's costume.

It can be difficult to find the balance between how much detail to model and how much to set in the cloth properties. There are many techniques to use, but experimentation and iterations are the best way to quickly find a solution that you will be happy with.

In production, sometimes it's a challenge to determine whether to model folds and creases, or whether to let the wrinkles happen in the simulation. Folds that will always be present as part of the look should be modelled in. This would include things like pleats in dresses. If you want a clean look instead then don't model in too many wrinkles, as they'll be tough to smooth out during the simulation.

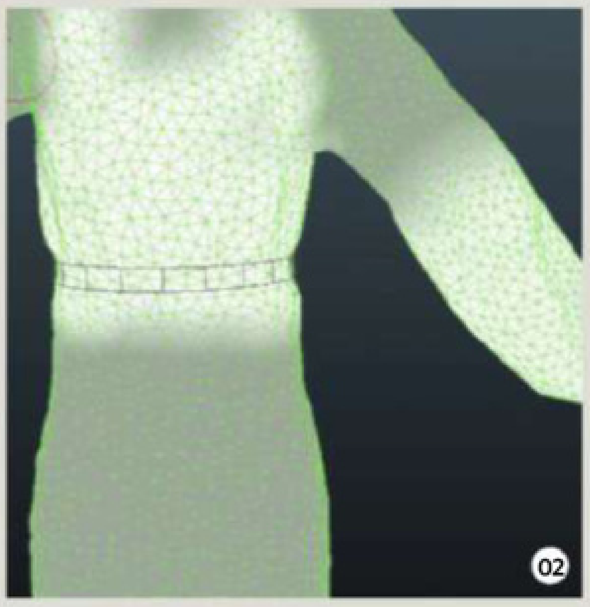
Cloth simulation shots can take a little back and forth with the animation and modelling departments during production. The animators have to guess where the cloth is going to be in space, but a character effects technical director can't simulate the clothes without animation. It doesn't make sense to send the model back to the modelling department for every little fix. That's why digital tailoring needs to be done for the outfits that your animated character will be wearing.

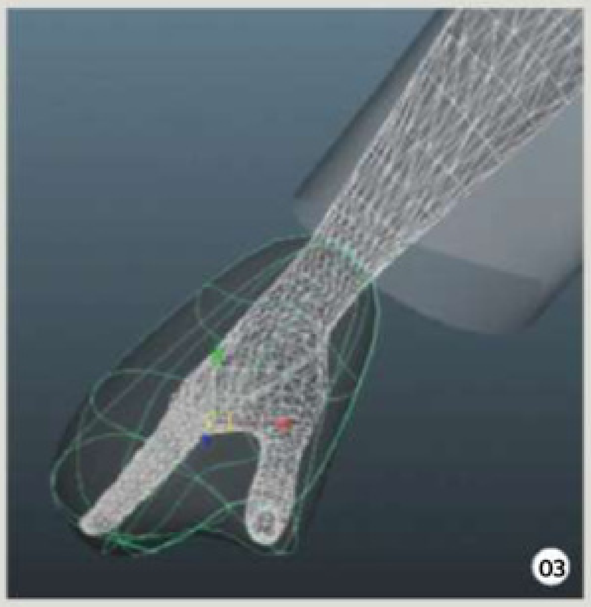
Modelling a costume is only the beginning when it comes to simulating clothing. Capturing the level of detail in a concept painting can be tricky and demands very high poly counts. You will want a simplified mesh for simulation with all the pockets, buttons and details removed. Keep the hi-res clothing model separate and Wrap Deform it to the mesh when your simulation looks suitable.

Cloth simulations need pre-roll animation before the character's shot begins. So, for an animation that starts on frame 100, you need your character transitioning from a T-pose neutral state for at least 30 frames. This will give gravity and physics some time to settle before your character starts their animation. If you see some jitters on frame 100, you will need more pre-roll frames.

01 Block in the major constraints

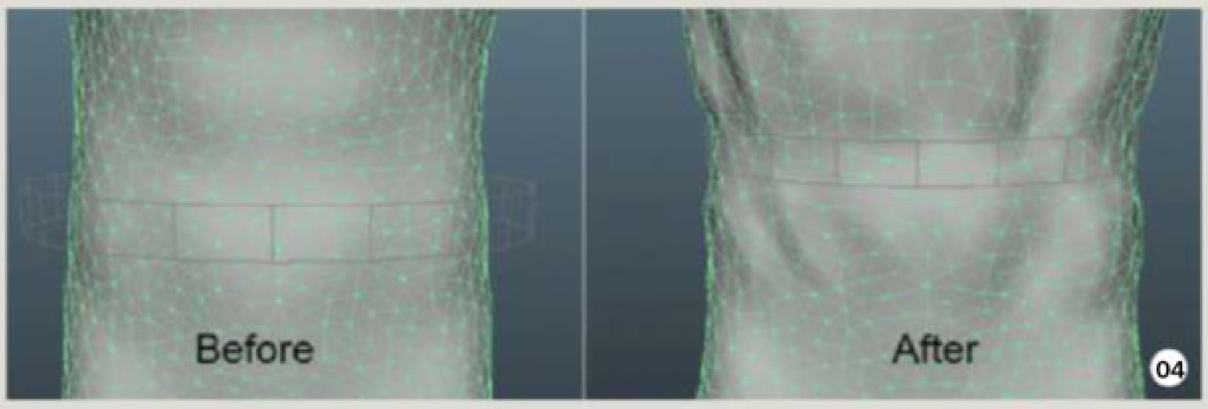
First, run the simulation up to frame 100 and see what happens. It will look like our wizard is wearing a formless sack, rather than a robe. We need to block in some of the major constraints so we can focus on fine-tuning later. Select the CVs around the neck, Cmd/Ctrl+select the collision body and select nDynamics>nConstraints>Point to Surface. Animate the Enable value in the Channel Box so the constraints don't activate until at least frame 80. This will let the whole robe settle a little before the neck constraints lock down. If you don't do this, the constraint areas will look like they are floating off the surface of the body. By changing the frame that the constraints activate on, you can change the overall tailored look for any constrained areas.





Finding the right properties

Robes will often be made out of a very fine silk. In recreating this, properties can only go so far – there is no solid rule on what these values should be, since many variables contribute to the simulation. The scale of your character, the scale of the world and geometry tessellation levels will all radically change the look during simulation. Properties such as Bend Resistance may not be enough for the level of wrinkles you are looking for. If you aren't getting the look you want, you may need increased geometry for your cloth mesh. Try subdividing your original input mesh to give it more geometry. Remember this will slow down your simulation for each extra face of geometry you add.



02 Paint a map for the sleeve rest lengths

The Rest Length control will enable you to make some areas more baggy and loose without having to remodel your mesh. Select the robe, Cmd/Right-click Paint>nCloth Vertex Maps>Rest Length Scale and flood the map with a value of .82. Set the Paint Color value to 1 and paint the sleeves and the belly area. In the Attribute Editor, change the Rest Length Scale value of the nCloth node for the robe to 1.2. This will enable the areas painted with a value of 1 to stretch to the desired length during the run-up, while the areas flooded at a value of .82 will remain in the same place.

03 Replace collision hands with mittens

Fingers and toes are the worst enemy of character artists. They will frequently catch the edge of a garment and ruin an otherwise good simulation. Making low-res mittens without thumbs as a substitute for the full hands will enable the hands to still deform the cloth, but not to get caught on edges. This also means that you will save time because there are fewer poly faces to calculate collisions for. Make the mittens into Passive Collision objects. You can Wrap Deform the new simple hand mittens onto the body or parent them into a rig.

04 Tighten the belt

If you just create a constraint for the belt, you will get a rigid belt floating off the surface of your character. Instead, select the belt and make it a Passive Collision object. Animate the belt's XYZ scale attributes during the pre-roll. This will shrink the belt onto the body and create creases and folds when it tightens down. Create a Keyframe value of 1 for the Scale attributes at frame 70, then change the value to .968 at frame 75 and set a key. Your belt should now animate a little smaller in the pre-roll and the robe should reveal some folds where it contacts the belt.

05 Adjust the rest length of the robe

Another way to adjust the volume of a sim is to put a Lattice on the rest pose. Duplicate the robe mesh and select Animation>Create Deformers>Lattice. Drag the bottom of the Lattice cage down to make the duplicated robe longer. Select the original robe, then Cmd/Ctrl+select the new, longer robe. Go to nMesh>Rest Shape>Connect Selected Mesh to Rest Shape. Nucleus will use the longer robe as a rest pose during the simulation. Add a plane and animate it moving upwards during the pre-roll so the robe will correctly collide with the floor.

06 Simulate the cloth movements

With the major tailoring out of the way, it's now time to set all of the Dynamic Properties of the robe in the nCloth Object node and in Nucleus. Look closely at are the Stretch, Bend and Compression Resistance settings. If your character is flying or moving through the air, you'll want to pay attention to the Lift, Drag and Tangential Drag attributes. Try playing with lower Gravity attributes to give a more floaty look to your character and their robe.

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Maya, Arnold

Shader techniques in Arnold

"How can I use Arnold to create a series of shading networks for look development?"

Thanks to Utility nodes and adjusting the Standard Shader attributes, it's very easy to build a shading network in Arnold; the unbiased path tracer currently used at a variety of animation and visual effects studios. We can build a comprehensive and useful network in Arnold by using techniques such as layering shaders, creating noise and adding subsurface scattering. Here we'll cover the attributes of Arnold's Standard Shader and Utility nodes, focusing primarily on wood grain. For more details, refer to the video tutorial supplied with the issue.

01 Get to know the Arnold Standard Shader attributes

The values of the attributes in the Standard Shader will depend on what type of wood you're planning to use. Under the Diffuse tab, you'll see that there's a spot for plugging in your Color map. For this tutorial we'll only focus on the Weight and Color attributes under this tab. The Weight slider dials in how much diffuse or base colour we're using. Under the Specular tab, there is another attribute for Color and Weight, similar to the Diffuse tab. Under the tab BRDF there are three specular types – we'll use Cook Torrance, which is the standard specular reflection, adjusting the Roughness attribute to decide on how soft or hard our specular will be. There is also a standard input for a Bump or Normal map.

02 Plug in maps

For this wooden shader, we'll be using three texture maps. One is for colour, a standard wood grain, the second is a Bump map and the third is a Specular map. Connect the Color map to the Color attribute under the Diffuse tab of the Standard Shader. Then connect the Specular map to the Color attribute under the Specular tab. Try raising the Roughness to give the wood grain a softer look. For wood grain, assign the BRDF to cook_torrance, then plug your Bump map into the Bump Map attribute under the Bump Mapping tab. For a smoother wood grain, keep the Bump Map value low.

01

03 Add layers to the shader network

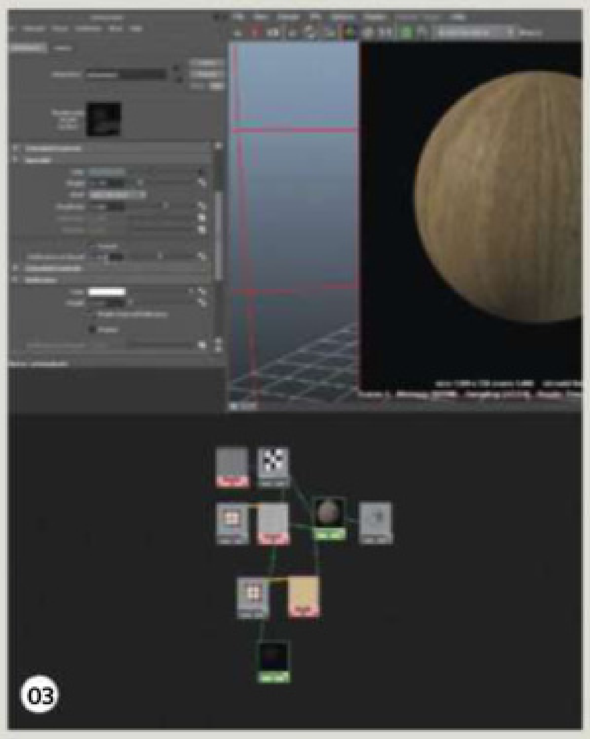
Next we're going to add another layer of specular onto the existing network. Create another Standard Shader and turn the Diffuse Weight to 0. Under the Specular Color, we'll be creating a facing ratio, or Fresnel effect. To do this, create a Ramp and a Sampler Info node. Change the Ramp values so that the U co-ordinate is black and the V is white. Using the Connection Editor, plug the facing ratio of the Sampler Info node into the V co-ordinate of the Ramp. I like to plug a Fractal into the V co-ordinate of my Ramp to break up the Fresnel effect.

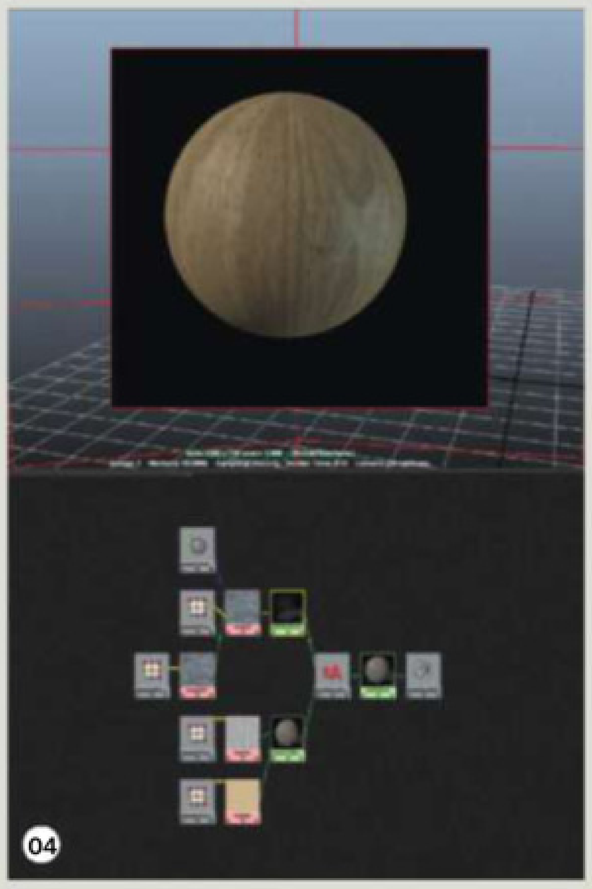
04 Combine the layers

Using an Average Utility, plug your base shader network into the input.0 slot of the Average node. Add the new specular network to the input.1 slot of the Average node. This combines the two networks using a Sum operation, essentially just adding the specular on top of our base network. This is very similar to a layered texture network. Create an aiUtility node and drag the Average right into the Color slot of the aiUtility, which will act as a surface shader. Also under the Shade attributes, change the Shader mode to Flat. Assign this Utility node to your object in the place of the base shader so the new result will have your combined shader networks.

05 Create noise

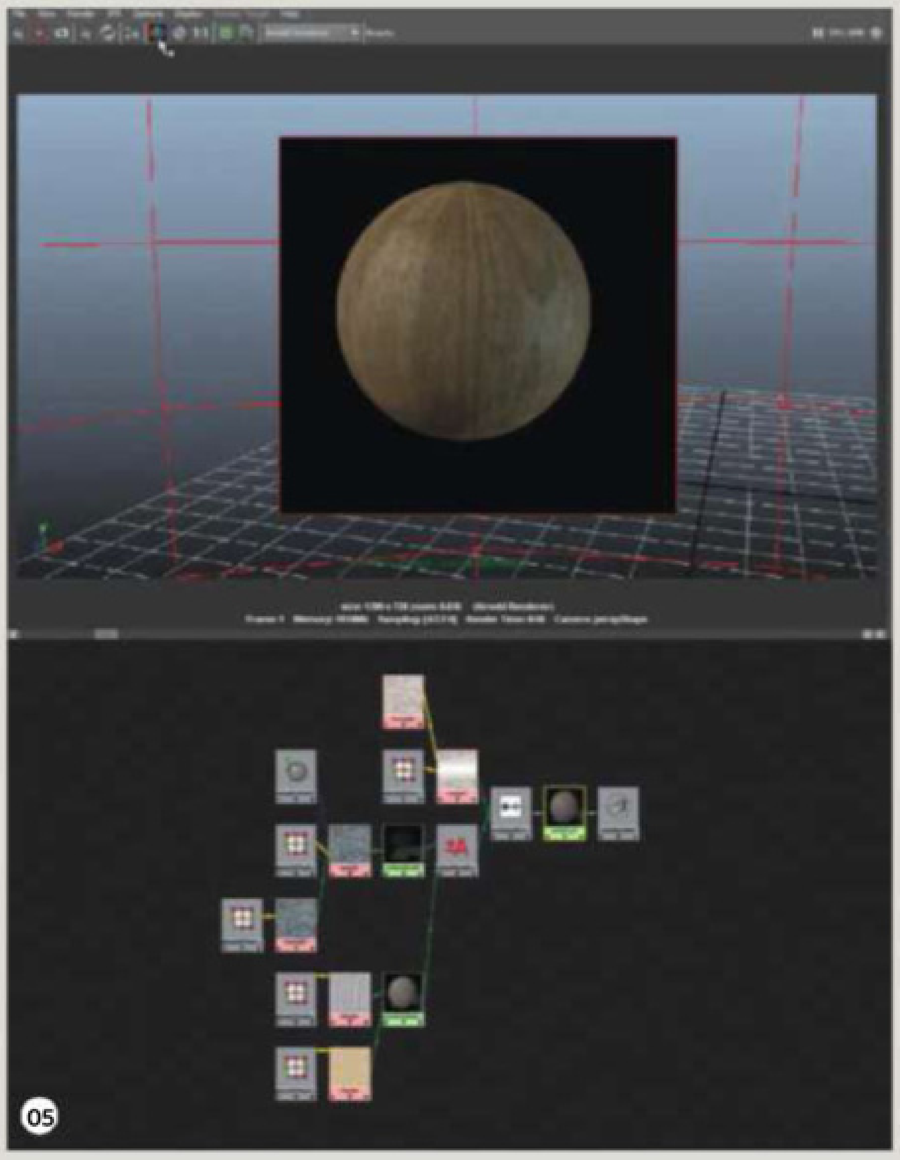
Using Fractals to break up your textures is something that can add to the shading network. Create a Ramp and plug a Fractal into the U and V co-ordinates. Then in middle of the Ramp, leave a notch white, so that the pattern will exist as Fractal, white, Fractal. You can change the amplitude and colour of the Fractal depending on how much noise you want to dial into your shader. A Multiply/Divide node can add this noise right on top of your existing shader. Plug the Ramp into one Input slot in the Multiply/Divide node and the existing Average into the other slot. This will eliminate the white values of the Fractals and leave just the dark noise. Substitute your Multiply/Divide node into the Color slot of the aiUtility node to take the place of the existing Average.

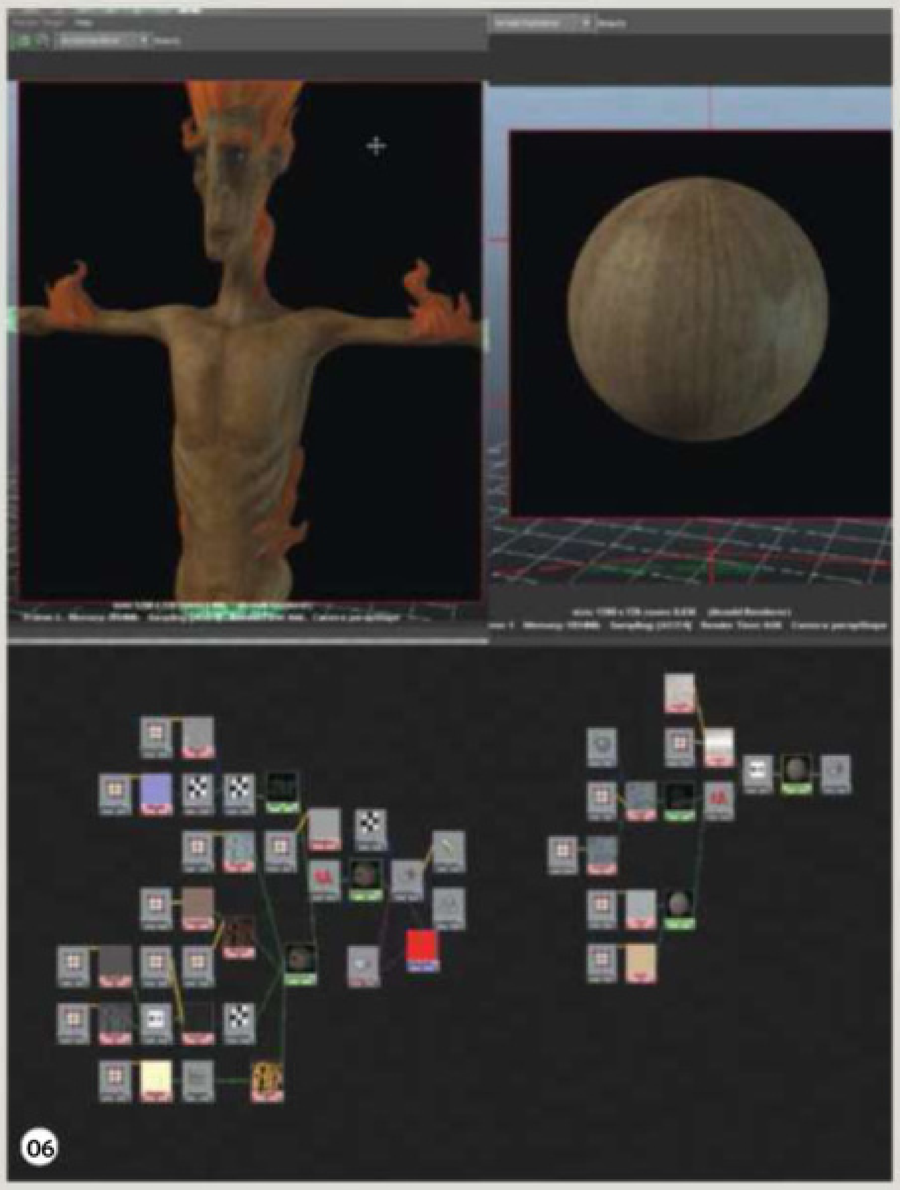




06 Add subsurface to your Standard Shader

Under your base standard shader, you'll see a Subsurface Scattering tab. This is a less expensive rendering option if you want to dial in a subsurface scattering effect to your network. Under the Color attribute, you can plug in your Subsurface map. Adjusting the Weight value will adjust how much of the subsurface effect will go into your shader. The Radius slider shows how much light is scattered, so a Radius value of 0 will create no subsurface effect.





'Essence' short film

The character and shading network used in this tutorial are part of a short film called 'Essence'. The short tells the story of a dying man who is reincarnated into a candle flame and realises he only has moments to live. Our pipeline for 'Essence' uses Arnold renderer, which has proved to be both quick and reliable. Learn more at www.tinyurl.com/3DAEssence.

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Samurai
Hasan Bajramovic

> Overall, the process is pretty straightforward – block out the big shapes first and then detail them. Refine those shapes and use your library to kitbash some details here and there. Keep the scene clean and organise materials early on so you can add the shaders with ease later on

KSENIA Z-1C 2013

This image depicts the early stages of a cyborg girl being built up. It was created as an online masterclass demo for the Gnomon Workshop. The process covers all steps and starts from the beginning with a simple a sphere. It's divided into three steps – modelling in 3ds Max, shading in KeyShot and post-processing in Photoshop.

I made this...

Incredible 3D artists take us behind their artwork

Artist info

Gavriil Afanasyev Klimov

Website www.hexeract.org
Country UK
Software used 3ds Max, KeyShot, Photoshop
Bio A senior concept artist working in the movie and game industries

Storemags

Heavy hitters

REVIEWS BY Orestis Bastounis, technology writer, UK

Desktop workstations are the engines of the 3D industry. Unlike portable systems, they're comparatively unbound by thermal, energy or spatial limitations. With a workstation you get the highest-performance graphics cards and processors, massive amounts of memory, flexible storage and the ability to easily add new hardware whenever it's needed.

We wanted to see what four top workstations could do with Nvidia and Intel technology on board, which is why we got in touch with four workstation vendors and asked them to send us the very best Nvidia powered tech they could offer for around £5,000, excluding VAT.

Across the following four pages we will consider the pros and cons of the various workstations, and how the Nvidia and Intel technology helps power or, as the case may be, hinder these high-end rendering beasts. Read on to discover how Nvidia and Boston, Interpro, Scan and Workstation Specialists combine for your benefit.

Essential info

Price: £5,349 (approx. $8,937 US)

www.boston.co.uk/products/workstations

OPERATING SYSTEMS

- Windows 7

TECHNICAL SPECIFICATIONS

- 2x Intel Xeon E5-2670 v2 2.5GHz (20 cores, 40 Threads)
- 32GB ECC DDR3
- Nvidia Quadro K4000
- 2 x 180GB SSD, 2x 3TB HD

Boston Venom 2306-7T

Boston took an interesting approach with the configuration of its 2306-7T. A sizeable chunk of the budget has gone on storage rather than focusing on rendering performance alone. It's worth noting that it comes with two 180GB Intel 520 SSDs and two Hitachi Ultrastar 3TB hard disks, set up in SATA and SAS RAID 1 arrays for data redundancy.

While RAID isn't bullet-proof data security, it does protect against device failure, which enables you to quickly replace the disk and rebuild the array. Disks can fail and nothing is more costly than downtime.

Most tower workstations are unsightly monoliths that are best hidden away from view, which is why it's refreshing to find that Boston's choice of chassis bucks this trend. The Ablecom CS-W431 case has a black gauze on the front, plenty of room for adding extra hard disks and good airflow.

Two 10-core Intel Xeon E5 2670 v2 processors clocked to 2.5GHz with a Turbo speed of 3.3GHz are present, sitting inside a dual-socket Supermicro X9DA7/E motherboard, based on Intel's C602 chipset. Together, they manage to provide an incredible 40 logical processors.

32GB of memory was included in the Venom sent to us, with room for expansion. Only half the 16 allocated slots are filled with 4GB 1866MHz ECC DIMMs.

Although the included Nvidia Quadro K4000 is a great performer, it is considerably less powerful than the K5000 included with the other machines. It has 768 shaders, 3GB of GDDR5 memory and 134Mbit/sec of memory bandwidth.

The storage array is configured to use multiplexing so, despite being RAID 1, you still get increased read speeds as you do with RAID 0, though write speeds are unaffected. The SSD array peaked at 900MB/sec and the hard disks broke 200MB/sec. Impressive, but we found the capacity slightly limiting. After installing the programs we needed for testing, only 40GB of space was left.

The overall workstation performance is good, but not record-breaking. With 40 logical cores, rendering times are great, but the middling clock speed of the Xeons slightly reduces its performance on more detailed renders, compared with workstations that use faster chips.

It was claimed that the system performed excellently in Cinebench, beating Interpro's K5000-equipped system in the OpenGL test, but its lower SPECViewPerf scores conclusively demonstrate the comparative limitations of the K4000.

The good & the bad

- ✓ Features a very high number of CPU cores
- ✓ Fast RAID 1 array
- ✗ Only a K4000 included
- ✗ Only 32GB memory
- ✗ Low CPU clock speed
- ✗ Restrictive SSD capacity

Our verdict

Features	8/10
Performance	7/10
Design	8/10
Value for money	7/10

"The Venom delivers across the board, but its K4000 GPU lets it down in most of the real-time 3D tests"

Final Score 7/10

Interpro E200IBE

Interpro has chosen to use Supermicro components wherever it can in the E200IBE, a brand with a proven track record for reliability. It has used the Supermicro X9DAI dual-socket E-ATX motherboard, an ugly but tank-like Supermicro tower chassis with a 900W PSU. Even the heatsinks that are attached to each of the Intel Xeon E5 2680 v2 processors are from Supermicro.

Both of the two 2.8GHz Intel Xeon 2680 v2 chips have ten physical cores, 20 logical, for a mind-blowing total of 40. Each chip has 25MB cache and a Turbo frequency of 3.6GHz. Along with Boston's similarly specced Venom 2306-7T, this is the most cores we've ever seen in a dual-processor workstation before now.

There's 64GB of ECC system memory as well, plus an Nvidia Quadro K5000 card, which packs 1,536 shaders and 4GB of GDDR5 memory. This impressive combination of high clock speed, an absolutely massive number of CPU cores, plus a high-performing graphics card looks like a great specification for successful all-round performance.

As with other workstations with E-ATX motherboards, there are 16 DIMM slots, so you can increase the memory to 512GB if needed. Likewise, a 480GB PNY Prevail 5K high-endurance SSD gives plenty of flexibility, with the kind of generous SSD capacity we want from a high-end workstation. This SSD did show limited write speeds of 301MB/sec in our testing, but the read speeds clocked in at 436MB/sec. Although the workstation we received came with a DVD writer, Interpro told us that shipped systems will be equipped with Blu-ray capabilities.

In rendering tests, the E200IBE showed great performance across the board. 3ds Max times weren't the very best, but they were still quick. Cinebench CPU results topped the list, and its real-time 3D performance in SPECViewPerf was similarly fast.

As with Scan's 3XS GW-HTX30 (see p98), the E200IBE has a great balance of high clock speed, core count, graphics and memory. It's good value too. Our only criticism is that although the results are consistently good, it doesn't outperform any other workstation by any wide margin. Despite this, it appears that no 3D software can hold it back either.

Essential info

Price: £5,195 excl. VAT
(approx. $8,685 US)

www.ipworkstations.com

OPERATING SYSTEMS

- Windows 7, Windows 8 or Linux

TECHNICAL SPECIFICATIONS

- 2x Intel E5 2680 v2 2.8GHz (20 cores, 40 threads)
- 64GB ECC DDR3 memory
- Nvidia Quadro K5000
- 480GB PNY Prevail SSD
- 3TB Seagate Barracuda Hard Disk

The good & the bad

- ✓ Built with a high number of processor cores
- ✓ Manages a fast overall CPU clock speed
- ✓ Fast graphics performance
- ✓ Relatively good value
- ✓ Large capacity SSD
- ✗ Unsightly chassis

Our verdict

Features	8/10
Performance	8/10
Design	7/10
Value for money	9/10

"Interpro's system has few weak points, but while it doesn't top all performance charts, it still does well in every test"

Final Score 8/10

A The Boston Venom 2306-7T's shell is refreshingly discreet

B The Nvidia Quadro K4000 is good, but it is nowhere near as powerful as a K5000

C Interpro's E200IBE benefits from a range of quality features

D While not the fastest, the rendering tests show that the Interpro performs well overall

Scan 3XS GW-HTX30

OUR TOP CHOICE

The GW-HTX30 comes out top in our workstation tests

Workstations are big things, but Scan's latest is an absolute monster, verging on unwieldy.

Housed in an 18kg, 560mm high Fractal Design XL case with a glowing Scan logo above the card reader, it's one of the biggest workstations we've ever seen. The dual-Xeon E-ATX Asus Z9PE-D8 motherboard occupies about 12 square inches, so in order to provide plenty of extra airflow, Scan has opted for a case that's bigger still.

But the weight is also down to the water-cooling rig. Corsair H80s cool the two Intel Xeon E5 2687W Ivy Bridge v2 processors, with big radiators mounted at the top of the case. Each of the processors has eight physical cores for a total of 32 logical (hyper-threaded) cores. This is slightly less than the 40 that are present in the other systems, but the faster clock speed of 3.4GHz is very welcome.

An Nvidia Quadro K5000 is slotted into the top PCI-Express slot, but when poking around inside, we noticed that the motherboard only has 8 memory slots, which are all filled with 8GB ECC DIMMS, for a total of 64GB. Supermicro motherboards, with 16 slots, offer greater expandability.

Scan has played it safe with the storage configuration – a 240GB PNY Prevail SSD and a 2TB Seagate Barracuda. The SSD may not be the fastest around and there's no attempt to boost speeds using RAID, but the Prevail has much better endurance than standard consumer SSDs.

The combination of high clock speed and plenty of cores makes for a great all-round choice. 3ds Max rendering times and CPU benchmarks were brilliant with the GW-HTX30, its multi-core Geekbench score smashed records and its real-time 3D performance in Cinebench was impressive.

However, we encountered a problem with SPECViewPerf 12. The software wouldn't read the total amount of system memory and refused to run. We couldn't solve the issue, even after calling both Nvidia and Scan.

So instead, we ran the older SPECViewPerf 11 software and used that to compare the GW-HTX30 with workstations from last year. As with its other OpenGL results, it measured up well against them. Since every other benchmark ran fine, we'll put this down to a software bug rather than an issue with the 3XS GW-HTX30.

F

Essential info

Price: £5,400 excl. VAT **(approx. $9,023 US)**

www.scan.co.uk

OPERATING SYSTEMS

- Windows 7

TECHNICAL SPECIFICATIONS

- 2x Intel Xeon E5 2687W v2 3.4GHz, 16 Cores, 32 Threads
- 64GB ECC DDR3 memory
- Asus Z9PE-D8 WS
- Nvidia Quadro K5000
- 240GB PNY Prevail SSD
- 2TB Seagate Barracuda Hard Disk

E

The good & the bad

- ✓ Fast CPU clock speed
- ✓ High number of CPU cores
- ✓ Fast graphics performance
- ✓ Quick rendering times
- ✗ Case almost too large and heavy

Our verdict

Features	8/10
Performance	9/10
Design	8/10
Value for money	7/10

"The combination of high clock speed and multiple CPUs tears through all rendering software with ease"

Final Score 8/10

E Scan have played it safe, with a 240GB PNY Prevail SSD plus 2TB Seagate Barracuda

F The workstation itself looms over other systems, at a towering 560mm high

G The WSX6v3's specs are very different to the others

H The rendering tests proved slow, as the WSX6v3 took twice as long to render in 3ds Max than other workstations

Workstation Specialists WSX6v3

The WSX6v3 is the latest incarnation of Workstation Specialists's high-end range, emblazoned with the familiar red and white company logo on the front.

There's a big difference in its specification from the other workstations we were sent. It was shipped with a high-end Intel Core i7 4930K desktop processor, water-cooled and overclocked, rather than a pair of Xeon chips. This makes it a very different kind of beast – it has fewer cores than other workstations, but runs at a higher clock speed, meaning it should perform better in certain tasks, but not quite so well in others.

Another unique aspect is its approach to storage. You get three Toshiba SSDs and a hard disk. One is 256GB, which is the system drive. The inclusion of two 512GB drives configured in a Raid 0 array is a great extra, plus there's a 2TB hard disk as well.

Workstation Specialists have included an Nvidia Quadro K5000 with 4GB of ECC DDR3 memory. Although Nvidia's Kepler cards came out a while ago, they're still a favourite for high-end workstations. 32 ROPs, 1536 shaders and 172.8GB/sec of memory bandwidth are bested only by the K6000.

One of our first tests was a speed check on the SSD Raid array. With almost 1TB of flash memory, we expected great results and we certainly weren't disappointed. 882MB/sec read speeds and 824MB/sec write speeds are only beaten by PCI-Express SSDs. The main system SSD fared well too, with 512MB/sec burst read speeds.

The processor has been overclocked to 4.3GHz, which puts some serious punch behind the K5000's rendering hardware, providing great SPECViewPerf 12 and Cinebench OpenGL results. However, the Core i7 only has six physical cores, which affects its 3ds Max rendering times. Test renders took twice as long on the WSX6v3. Since Core i7 processors don't support ECC memory, you only get 64GB of vanilla DDR3 – a turn-off if guaranteed accuracy is vital.

The WSX6v3 is a great workstation, but we're not convinced it's the best option for all types of 3D work. It's fantastic for real-time 3D and we can imagine the fast Core i7 and SSD array chewing through high-bitrate 4K video editing easily, but highly multithreaded rendering software loses out. The Dual Xeon-based systems might be slower with real-time graphics, but are much faster on the CPU front. Our results certainly confirm this.

Essential info

Price: £4,295 excl. VAT
(approx. $7,186 US)

www.workstationspecialist.com

OPERATING SYSTEMS

- Windows 7 or Linux

TECHNICAL SPECIFICATIONS

- Intel Core i7 4930K 4.3GHz 6 Cores 12 Threads
- 64GB DD3 memory
- Nvidia Quadro K5000
- 256GB Toshiba SSD
- 2x 512GB Toshiba SSD
- 2TB hard disk

The good & the bad

- ✓ Fast CPU clock speed
- ✓ Fast graphics performance
- ✓ Nippy RAID storage array
- ✗ Low overall core count
- ✗ No ECC memory

Our verdict

Features	7/10
Performance	7/10
Design	8/10
Value for money	7/10

> The WSX6v3 is brilliant, with a raw horsepower that packs a punch, but it renders slowly

Final Score 7/10

While Workspace Specialists's WSX6v3 performed admirably in the rendering tests, it unfortunately lacks the power and prowess that the Scan 3XS GW-HTX30 boasts

Conclusion

Choosing the right workstation hardware can be quite a balancing act – focusing on more cores at the expense of raw clock speed will lower real-time performance, while fewer cores means longer rendering times in software such as 3ds Max. Each of the four workstations we tested has a very different take on the core-count-to-clock-speed ratio.

It's worth mentioning that every vendor is more than happy to customise the configuration of a workstation, so if you would prefer a bigger SSD, more memory or a different processor, it can be easily arranged.

The limitations of its Core i7 processor mean the WSX6v3 isn't our first choice. It managed the best real-time 3D results, but it lacks ECC memory and has a low number of cores, so rendering times suffer. Its fast SSD RAID array is great, but we'd rather use it as a scratch disk for editing than for loading scenes.

Likewise, the extra cost of the RAID array in Boston's 2306-7T comes at the expense of a faster graphics card. There's a pretty big gap between the performance of the K5000 and K4000, and given the choice, we'd settle for more down-to-earth storage but a faster GPU.

Interpro's E200IBE delivered on all fronts, with the best processor score we recorded in both Cinebench and Geekbench, along with excellent all-around graphics performance and rendering times. The Supermicro chassis isn't great looking, but inside, the specification is absolutely spot-on for great rendering performance.

Ultimately though, it's Scan's wise choice of faster Xeon processors in the 3XS GW-HTX30 that wins the prize. The E5-2687W chips are 600MHz faster than Intepro's E5-2680 v2s and that extra clock speed shows across the board, with the fastest 3ds Max rendering times, the fastest Cinebench OpenGL scores and great all-round performance.

V-Ray's dynamic geometry means you can use billions of polygons © Taylor James Ltd

V-Ray 3.0 for 3ds Max

Offering a whole host of fresh updates and brand-new features, the latest version of V-Ray is finally here

REVIEW BY David Wortley, technical director at Taylor James

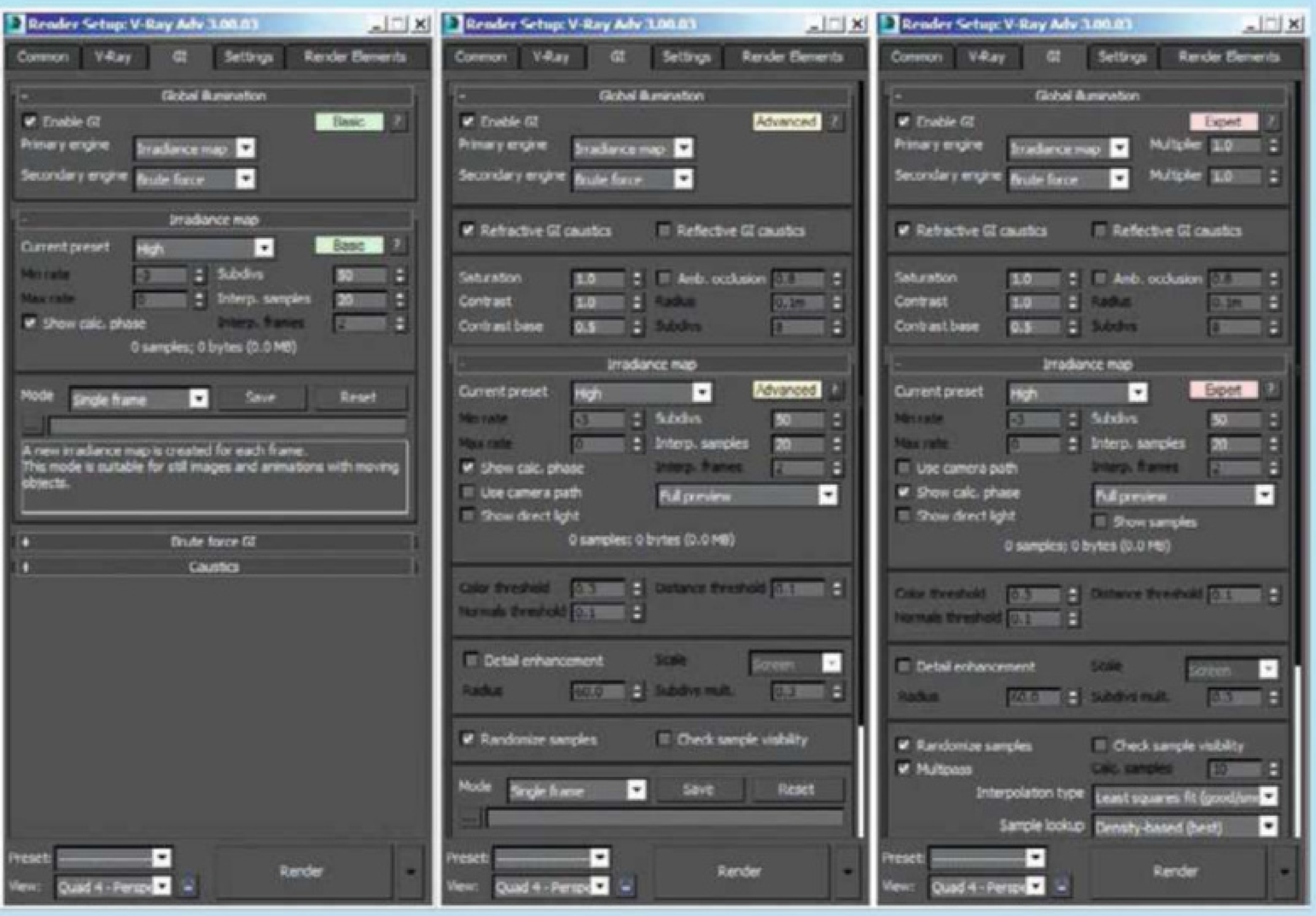
In the past, V-Ray's interface could initially appear to be full of somewhat difficult settings, at least for beginners. With V-Ray 3.0, however, two major developments have been implemented to make things simpler. First of all, there are presets included, which have settings for Interior, Exterior, VFX and Studio Render settings – all with sliders to quickly adjust the quality without needing to delve into the settings. In addition to this, the interface has been simplified – the Render Settings dialog box takes up less screen space and each rollout has a button to flick between Basic, Advanced or Expert, exposing only the essential settings at each level. Add to this a new help website with detailed descriptions and examples of what each setting does, and it's easier than ever to learn to use V-Ray.

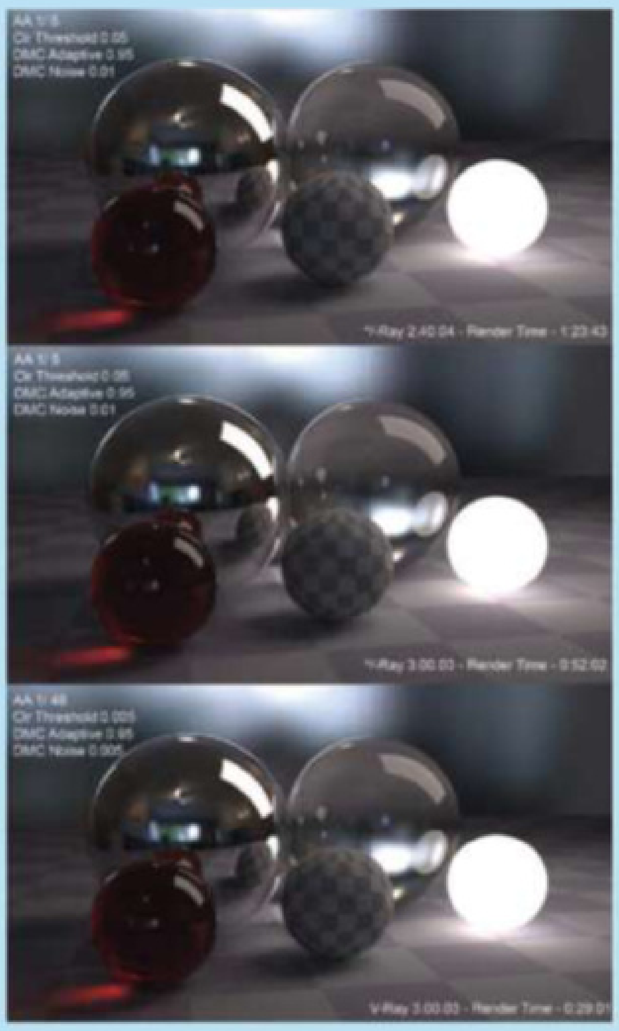
Rendering speed has been a primary focus of development for V-Ray 3.0, especially with brute force rendering. Due to changes in workflow, baked light caches and Irradiance maps are being used less and less, so an increase in brute force speed has seen some dramatic drops in render time.

For scenes where you have lots of lights, the new Probabilistic Lights feature can yield results of up to three times faster, with only a slight increase in noise near the lights. Further speed increases come from Embree being enabled by default and dynamic bucket size, which decreases the bucket size at the end of a render. This means that you won't wait as long for that one last bucket to finish rendering using one CPU.

Shading and rendering for hair and fur has seen numerous improvements in both speed and quality, with reports claiming that it's up to 15 times faster and, excitingly, is now supported in V-Ray RT CPU, so it's now a lot easier to do your look development and experiment with different settings.

There are hundreds of improvements all over V-Ray 3.0, from UDIM and UVTILE tags in the VRayHDRI map that enable simpler integration with MARI's texture maps, to proxies being able to load Allembic ABC files.





TOP Switching between modes hides some of the more advanced features that you don't need on a day-to-day basis

LEFT V-Ray 3.0 renders faster with the same settings, but has slightly more noise. However, tweaking the settings to remove the noise resulted in a faster render

Max Ray Intensity is really useful for dealing with fireflies in glossy reflections, which would normally require tweaking the Sub-pixel mapping and Clamp output to fix.

These new features all help to massively improve your workflow. For instance, Progressive Rendering means that you can quickly see rendering updated across your image rather than waiting for an individual bucket to finish. This fast-feedback method is fully compatible with all of the features of V-Ray and it's great for quickly adjusting your scene. V-Ray's Skin Shader also includes built-in subsurface and layered reflections.

The new Render Mask feature enables you to specify which objects or layers you want to render – you can use a bitmap mask to specify this, too. This feature will enable pipeline TDs to make some very powerful rendering tools and I can't wait to integrate it into my workflow.

One of the most exciting additions is VRayMetaball – a blobmesh-type particle mesher with a Texture Map input, which enables you to generate the sort of procedural high-detailed geometry that was only previously possible with the discontinued VRayISO plug-in. This new feature could be used to make coral, procedural rock details, sponge, candyfloss and a wide range of other exciting possibilities.

For those with advanced pipelines, it's possible to develop shaders that can render in 3ds Max and Maya using the VRmat material. This is a Custom Shader builder, and when you use OpenColorIO and custom LUTs, you can ensure a managed colour pipeline between software. The industry-standard OpenEXR 2.0 is supported, with data for Deep Compositing to enable more control in post-processing using pixel depth information.

It's certainly fair to say that V-Ray gets significantly more powerful with each update and this version is no exception – V-Ray really has matured with this release.

Essential info

Price: £650 / $1040 US*

www.v-ray.com

OPERATING SYSTEMS

- Microsoft Windows 8 Pro x64, Microsoft Windows 7 Professional x64, Microsoft Windows Vista Business x64 (SP2 or higher), Microsoft Windows XP x64 (SP3 or higher)

OPTIMAL SYSTEM REQUIREMENTS

- Intel Pentium 4 (64bit) or equivalent AMD 64 processor with SSE2 technology or newer
- 4 GB RAM (8GB or higher recommended)

V-Ray Metaballs armed with BerconMaps can create some amazingly detailed procedural geometry © Chris Jackson

The good & the bad

- ✓ Speed improvements
- ✓ Simple UI
- ✓ New ray-traced skin shader
- ✓ Useful updates across all areas
- ✓ Deep compositing output
- ✗ Some render settings can be counter-intuitive
- ✗ No out-of-the-box presets for materials
- ✗ Deep Output not currently supported by Progressive Sampler
- ✗ V-Ray 2.4 files need to be edited to use in V-Ray 3.0

Our verdict

Features	10/10
Ease of use	8/10
Quality of results	9/10
Value for money	8/10

"V-Ray is faster, simpler and has taken a huge step forwards with this release"

Final Score 9/10

* Price conversion correct at time of printing

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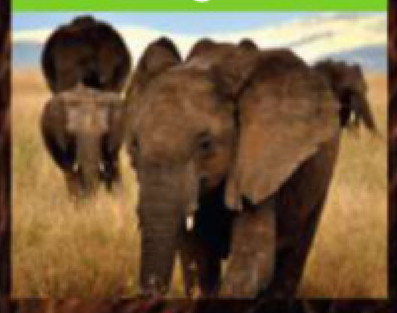
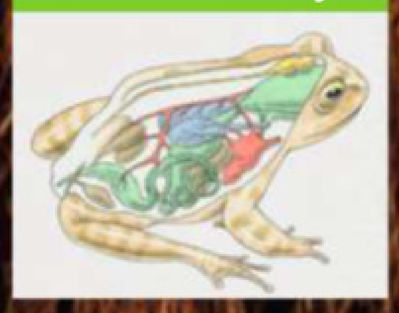


Creature cutaways



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"For the price of what a 30-second advertisement would cost in France, we made 12 minutes"

Laurent Witz writer and director of 'Mr. Hublot'. Page 106

Mr. Hublot
Zeilt Productions
Laurent Witz, writer, director and producer of Oscar-winning short 'Mr. Hublot', reveals how the team created wonders on such a small budget
© ZEILT Productions, Arte, Watt Frame

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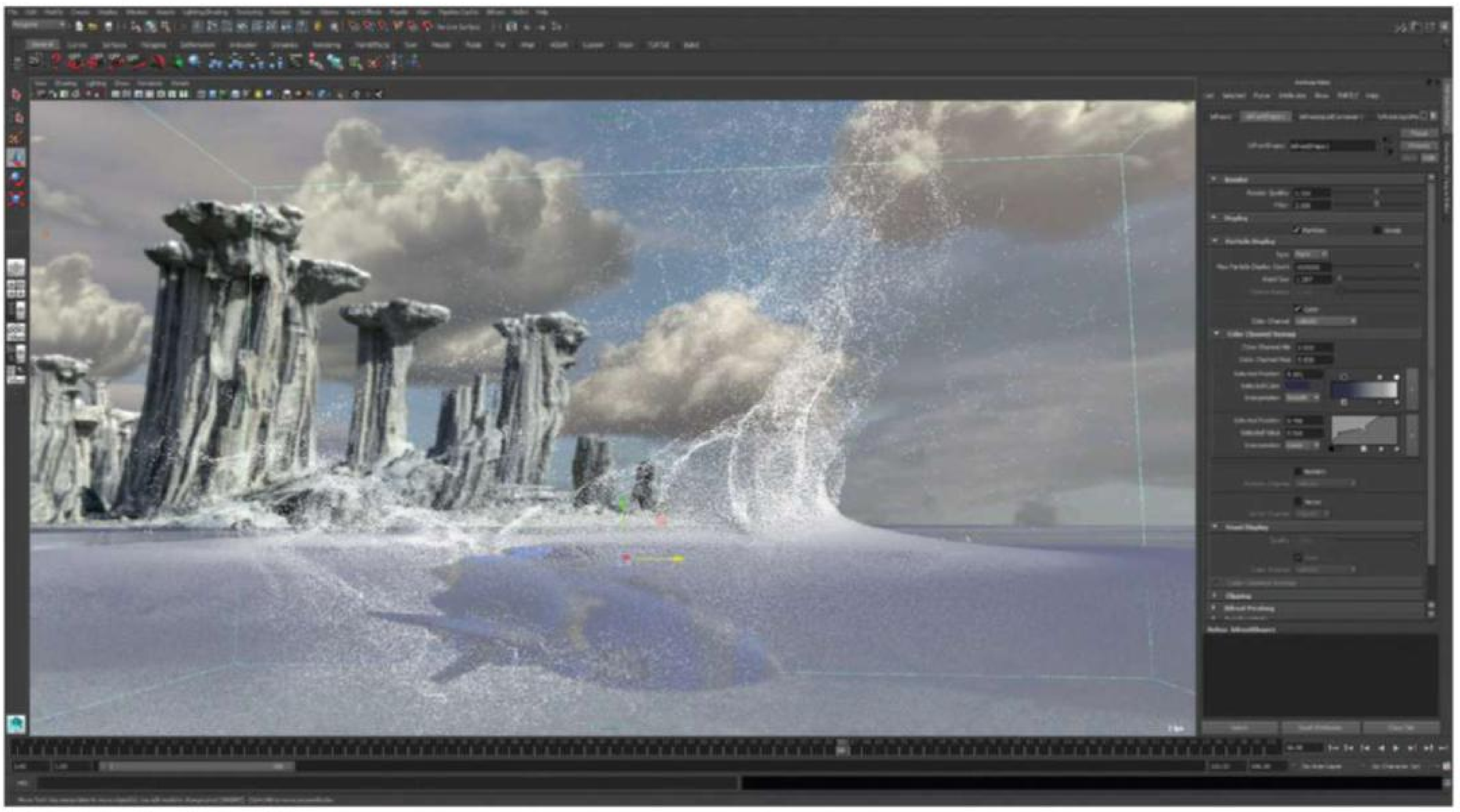


Autodesk Maya 2015 – what to expect

Chris Vienneau, director of M&E, film & TV solutions at Autodesk, reveals what's coming in Maya 2015

Maya 2015 is coming, and with it Autodesk aims to go back to basics. Speaking to Autodesk's Chris Vienneau at a recent event, 3D Artist learned that the core workflow of the program has been a main developmental focus over the past 18 months, with greater emphasis placed on a rental model as well as the new viewport and effects abilities.

Key new features in this latest upgrade to Maya will include XGen Arbitrary Primitive technology, a tool originally created at Disney that enables users to hand-sculpt and groom hair, to create fur and feathers, or to quickly populate large landscapes with grass, foliage, debris trails and much more. This was originally only shipped in the Autodesk Maya Extension with a less refined UI.

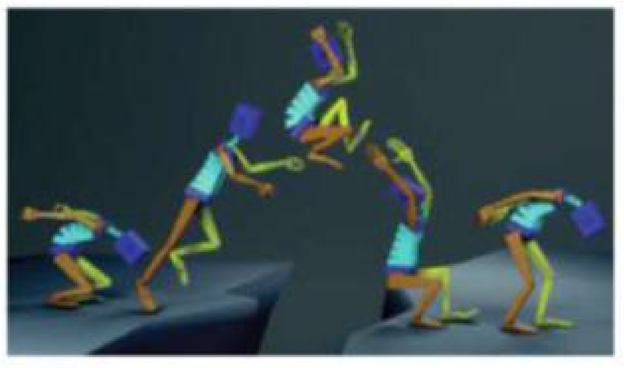
Another significant addition will be the nodal-based fluid simulator BiFröst, formerly known as Naiad before Autodesk acquired the technology from Exotic Matter in 2012. Autodesk has developed this tool with the aim of enabling generalists to create complex effects without the need for scripting. The development team from the soon-to-be discontinued Softimage will be working on it.

ShaderFX from Maya LT will also be included; a visual node-based system where Maya users can create and edit shaders directly in the viewport. Artists can then compile code to import directly into the game engine they're using.

Viewport 2.0 has also been finalised and is now on by default, allowing for simulations to be run directly within it. Modelling enhancements, improvements to Boolean performance and support for UV tiling have also been added, among many other features.

TOP New features such as BiFröst, XGen and ShaderFX are sure to make content creation a much simple process for generalists and specialists alike

BOTTOM At the time of going to press, Autodesk had just announced that the upcoming Softimage 2015 will be the last release of the software. Autodesk has stated that it will not, "recreate Softimage in Maya or Max, because it won't be efficient."



StareMaps.com

● **HAVE YOU HEARD?** • ILM plans open a London studio to work on the latest instalment in the *Star Wars* franchise

BFX 2014 kicks off

BFX open for entries to its 2014 competition

Following the success of the inaugural BFX competition last year – which saw students across the UK create short films with mentoring from industry experts at MPC, The Mill, Cinesite, Framestore and Double Negative – this year's competition's been announced as open for applications, with a deadline of 28 April 2014.

The competition, which is based on industry-style pipelines and production methods, will give the finalists exposure to cutting-edge practices as they live on campus free of charge, with a small stipend given to them for living expenses. The teams will need to create 15-30 second film sequences, which will to be based on one of 11 screenplays inspired by classic literature. With access to Bournemouth University and Arts University College Bournemouth production facilities and equipment, and mentoring from top Soho studios, the finalists can use whatever production platforms and processes they desire to create their sequences. This includes claymation, 2D, Maya, Houdini, NUKE, ZBrush, MARI, RealFlow, Maxwell Render, V-Ray, ToonBoom, Adobe Creative Suite, live action, green screen acquisition or any combination of these they wish.

To see the impressive final films from 2013's competition that were created in only six weeks, visit **www.bfxfestival.com/bfx-final-films-2013**

To apply to the 2014 BFX Competition, hopefuls will need to supply a pitch document and film, a creative and technical breakdown, storyboards and team biographies by 28 April 2014. The pitches will then be assessed by Bournemouth academics and industry professionals. The teams that have made it through will be given feedback that needs to be included in a revised pitch presentation when the competition begins in July 2014.

TOP The top individuals in the winning teams will be offered the chance to take up an internship at one of the studios contributing to the festival

BOTTOM The BFX festival is intended to showcase the future talent of the film and gaming industries, hopefully inspiring the next generation of 3D artists

Software shorts

Bringing you the lowdown on product updates and launches

Avatar Toolkit 2

Reallusion has announced Avatar Toolkit 2, an update to its 3D avatar creation and animation tool. Designed to work with iClone5, the toolkit enables users to assemble characters with interchangeable assets from puppet-ready body parts. Starting from the Reallusion avatar library or an imported base, users can use a series of animation panels to bring characters to life without complex rigging or modelling. Avatar Toolkit 2 for iClone is priced at $100 (approx. £60).

Golaem Crowd 3.1

Golaem has released the latest update to its crowd-simulation system for Maya, with support added for non-human characters, new flock and steer behaviours and an interactive revisualisation system. A three month licence costs $1,980 (approx. £1,185) excluding VAT. For more information on this recent update, head over to Golaem's official site at www.golaem.com.

Bournemouth University [BFX] VFX HUB

The VFX Hub at Bournemouth University presents 2 BFX Workshop short courses

An Introduction to Python Scripting in Maya

A 2-day course on April 28th and 29th 2014, aimed at people with an understanding of Maya but with no real experience of the Python programming language. The course costs £220 including lunch, tea, coffee and soft drinks.

The course includes:

An introduction to Python programming.
Scripting basic commands in Maya Python.
Basic Python GUI's.
Simple import and export workflows.

Digital Matte Painting and Nuke Compositing

A 3-day course from April 30th - May 2nd 2014, aimed at people with a basic knowledge of Photoshop and Nuke and an understanding of the principles of digital set extension. The course costs £330 including lunch, tea, coffee and soft drinks.

The course includes:

The acquisition, grading and preparation of reference images, then moves onto 2D matte painting for set extension using Photoshop CS6. Topics include:- perspective, light and colour matching, weathering and degradation and an introduction to Nuke compositing techniques. The aim is to produce a 2D matte painting and is it as a 2.5D environment projection using Nuke.

Both courses will be held in The Media School Bournemouth University - Talbot Campus, Fern Barrow, Poole, Dorset, BH12 5BB, UK

For more information and details of how to book a place on either course please contact Kerry Rowland-Hill - krowlandhill@bournemouth.ac.uk

Project Focus

Mr. Hublot

An obsessive man's clockwork life turns chaotic once he rescues a steampunk puppy in this Oscar-winning short

ZEILT productions Luxembourg

Project 'Mr. Hublot'
Company Zeilt Productions
Country Luxembourg
Bio Zeilt Productions was founded in 2007 to create 3D computer animation for film, television, the web, mobile phones and videogames. Zeilt has worked with commercial partners like Ubisoft, Fox, and Nokia. 'Mr. Hublot' is Zeilt's first original short, and it is now developing the short 'Douce Nuit' and the feature *Wilfred*.

Portfolio Highlights
2011 Enovos advertising campaign
2010 Luxgsm advertising campaign
2009 Ubisoft 'Football Academy' trailer

Website www.zeilt.com

Fans of *Wallace and Gromit* will be happy to discover another quirky man-and-dog tale to make them smile in 'Mr. Hublot'. This Oscar-winning short from writer and director Laurent Witz and co-director Alexandre Espigares has charmed festival audiences worldwide without a single word of dialogue. In a dozen CG-animated minutes, it comically illustrates the lengths to which an animal-lover will go.

Inspired by the industrial assemblage sculptures of Belgian artist Stéphane Halleux, 'Mr. Hublot' depicts an obsessive-compulsive recluse with a penchant for mechanical precision. "Stéphane's sculptures are simply fantastic," says Witz. "When I met him about six years ago, I told him that I would make a film about them.

"It took about a year to find the funding, and then another year of pre-production and design," Witz recalls. When co-director Espigares signed onto the project at the animating stage, he brought with him an expertise he had gained working as an animator on feature films such as *Iron Man 3* and *Happy Feet 2*. Espigares was also no stranger to the steampunk aesthetic, having also worked on the post-apocalyptic animated film, *9*.

"During the three years of production, we had a very small team," notes Witz, who credits art director and storyboard artist Pascal Thiebaux for developing the richly detailed, gadget-filled world for 'Mr. Hublot'. "We tried a lot of things in the drawing and animatic stage when it wasn't so expensive," Witz remarks. "Once we started on the 3D, we had to get things right on the first try. We had a very small budget for 'Mr. Hublot'. For the price of what a 30-second advertisement would cost in France, we made 12 minutes. It was crazy."

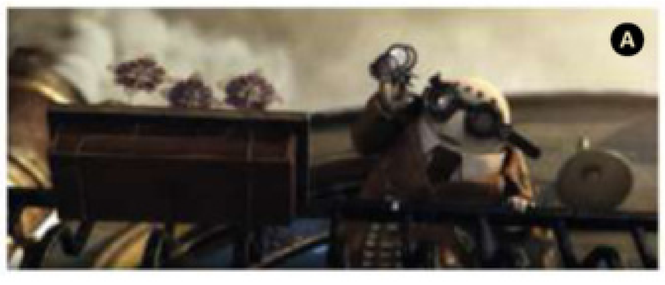
'Mr. Hublot' was animated in Maya and then rendered in mental ray, with exteriors rendered in V-Ray. The filmmakers' goal was to present a multi-textured world with a mix of beautifully lit surfaces. Some of the film's creative team worked for free out of love for the project, and some also worked remotely. They logged in to Zeilt Productions's Luxembourg studio from their home bases in Paris, Los Angeles and San Francisco.

Adding to the degree of difficulty was Witz's decision to fully capture the dimensionality of the world of 'Mr. Hublot' by making the film in 3D stereo. "I thought it was only natural to make this short in 3D because this story was initially inspired by 3D sculptures. However, in making the film in this way,

> "For the price of what a 30-second advertisement would cost in France, we made 12 minutes"
> **Laurent Witz, writer and director of 'Mr. Hublot'**

Contributors

Laurent Witz
The founder, writer, director and producer of 'Mr. Hublot'



A 'Mr. Hublot' was honoured with the prize for the Best International Animated Short at the 2014 International 3D & Advanced Imaging Society's 3D Creative Awards, which recognises the top achievements in stereoscopic moviemaking

B Mickael Coedel collaborated on 'Mr. Hublot' as animation supervisor. His previous credits include *Rango*, *Happy Feet* and *Pirates of the Caribbean: Dead Man's Chest*. "He was fantastic," says Witz. "He worked for us from San Francisco"

C Without a doubt, 'Mr. Hublot' is a character study, right down to the film's final, funny frames. "Everybody seems to think that Mr Hublot has changed, little by little during the film," Witz enthuses. "But even by the end of the it, he still has OCD"

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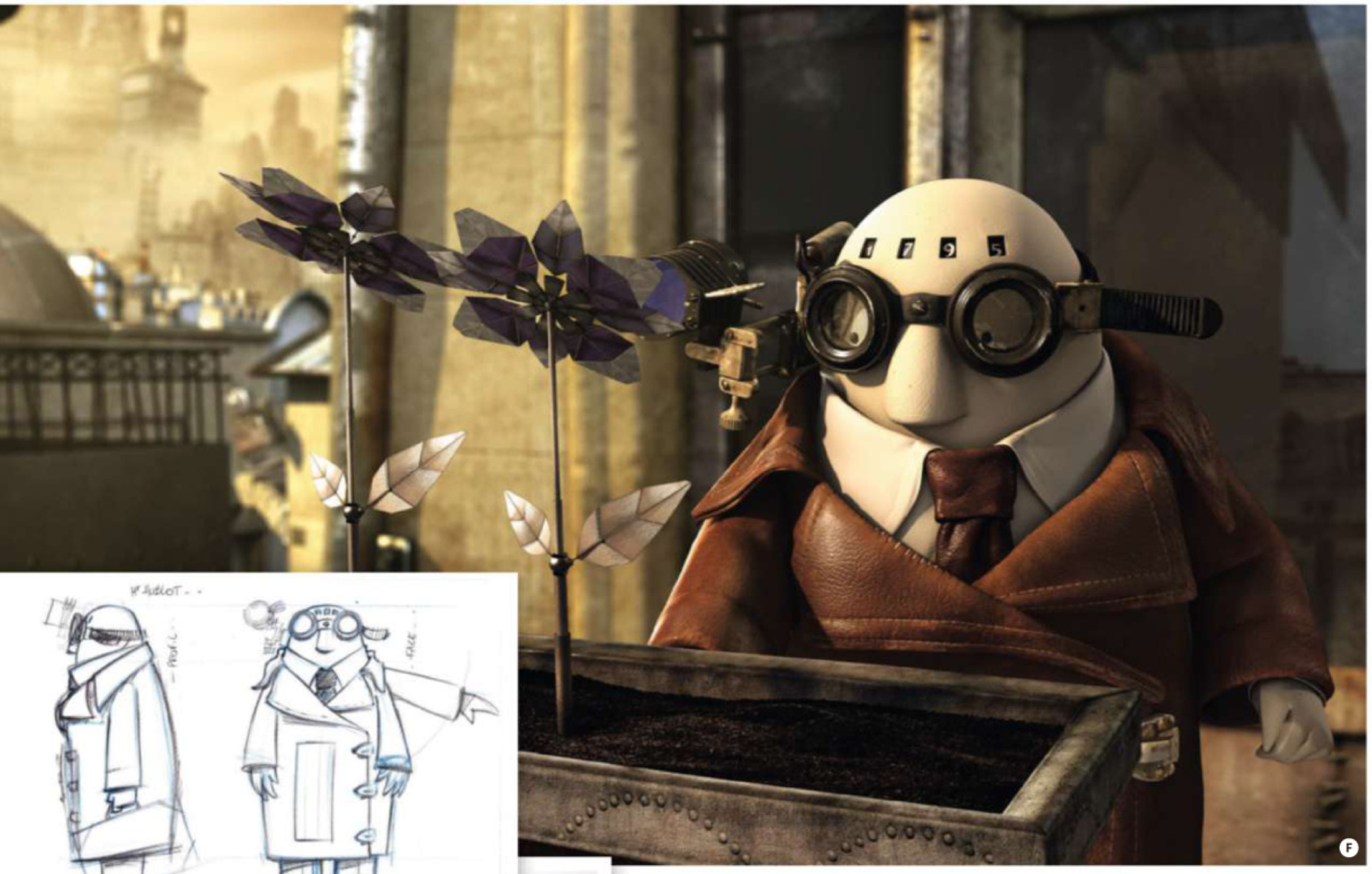
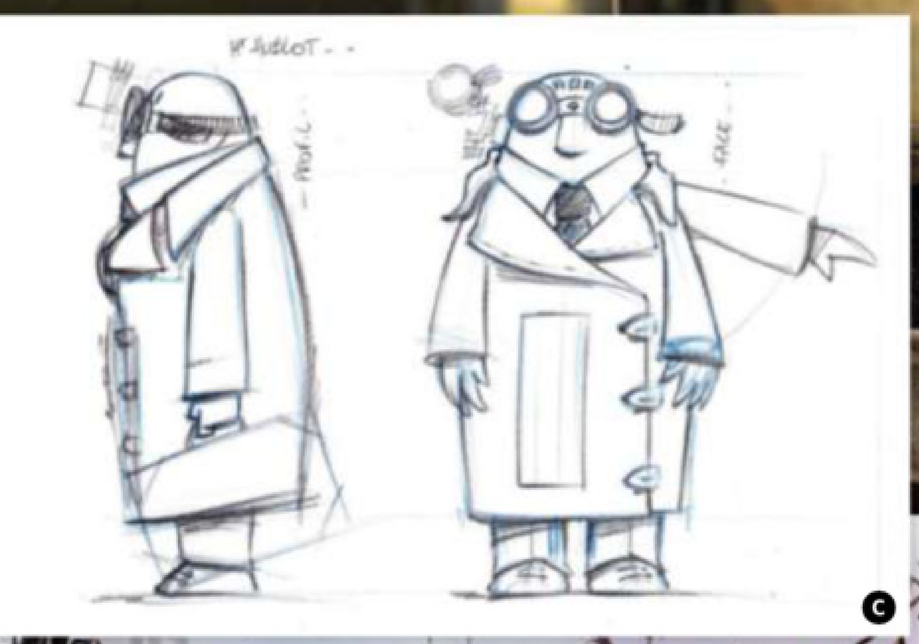
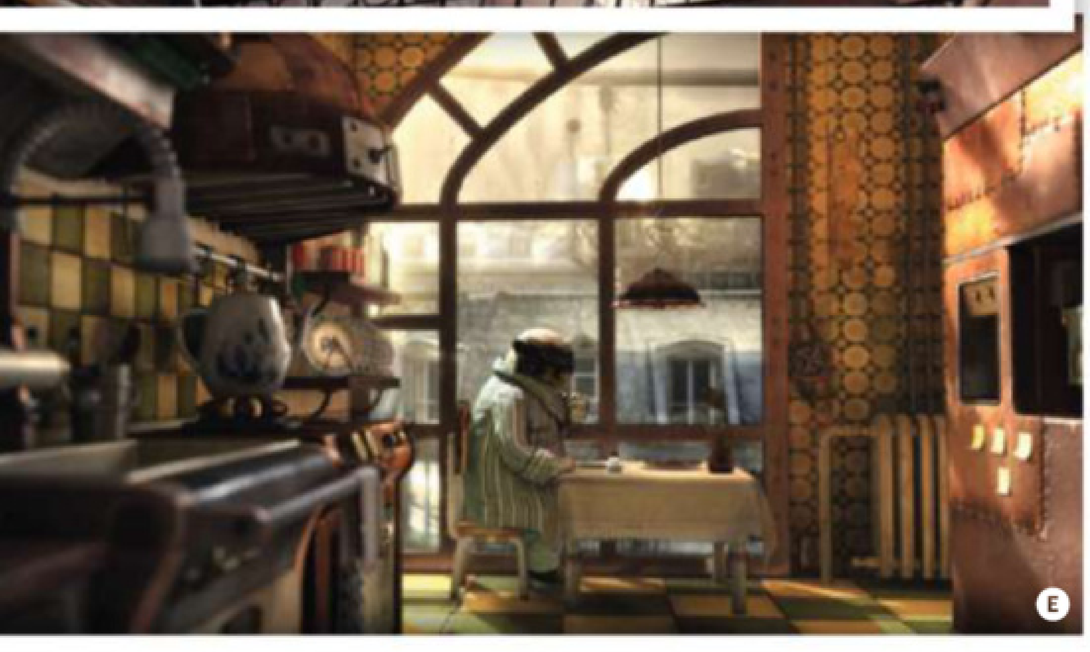






All images © ZEILT Productions, Arte, Watt Frame

Steampunk with heart

For writer and director Laurent Witz, the challenge was bringing emotional impact to Stéphane Halleux's inventive sculptures

"I thought we needed a story with emotion and poetry," says Witz. "In Stéphane's original vision, the character of Mr Hublot was huge. I thought we needed to make him a little guy who would evoke more emotion." To make the character believably obsessive-compulsive, Witz researched characters with OCD, notably studying the television series *Monk*. "Everyone has a bit of OCD, like when we check a door is locked several times. I hope when people have their own OCD moments, they'll think of Mr Hublot."

the 3D wouldn't solely be an effect..." The director was clearly thinking ahead. "I thought that making a 3D version would perhaps help us find the money to make 'Mr. Hublot' into a feature film," admits Witz.

That's a possibility that Witz intends to explore when he mingles with other filmmakers and Oscar nominees during the events surrounding this year's Academy Awards. However, he's keeping his ideas open. "I'm not sure if there will be an opportunity for a US feature production or perhaps a co-production," he explains. "Nevertheless, from the beginning of the project I've always thought that something more was possible with the idea. I just don't know what yet!"

D There was so much imagery created for 'Mr. Hublot' that Zeilt Productions is planning to publish an art book entitled *The Art of Mr. Hublot*. The book has been paid for though funds raised by a crowd-sourced campaign carried out online

E Laurent Witz also singled out contributions from Parisian animator Thierry Dezarmenien as well as Los Angeles-based animator Jamaal Bradley, who worked on *Monster House* and *The Croods*. "Because of them, 'Mr. Hublot' was possible"

F Mr Hublot's head contains a numerical counter and the numbers spin faster when he's feeling confused or stressed. "There are clues in those numbers," explains Laurent Witz. "When his counter runs very high, he's having a bad day"

Studio Access

I, Frankenstein

Adam Paschke of Rising Sun Pictures discusses how the studio brought *I, Frankenstein* to life

A

Creating stunning visual effects isn't always about conjuring up imaginative designs from absolutely nothing. Often, some of the most spectacular imagery presented on the silver screen is pieced together from multiple live-action elements. then brought to life by a team of talented artists – a bit like Frankenstein's monster, if you think about it.

That was the case for Rising Sun Pictures, which was charged with layering a complicated series of effects on top of a practical environment for one of *I, Frankenstein*'s key scenes.

"We had a very large scene involving what we called a stasis chamber," visual effects supervisor Adam Paschke tells 3D Artist. "The scope of that effect grew over time as we became more interested and excited about the details of the effects. It got bigger and better and received a good response from VFX supervisor James McQuaide and director Stuart Beattie, so we had the opportunity to create something quite memorable."

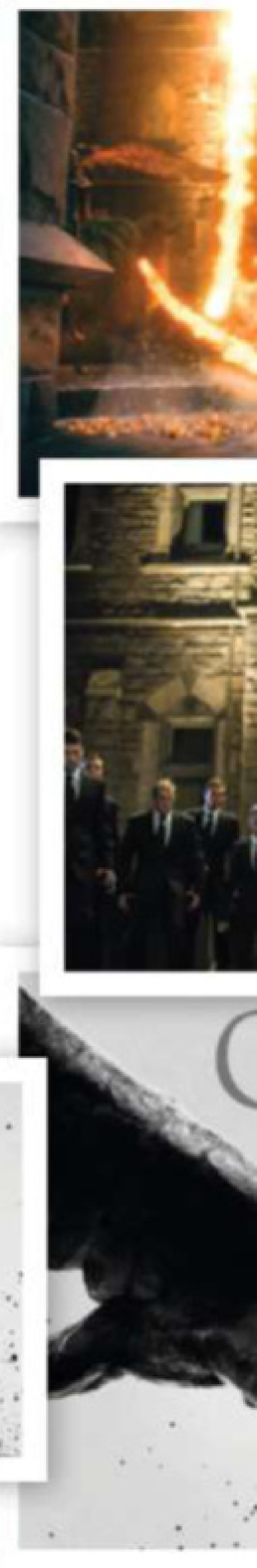
Designed to reanimate life, the stasis chamber is a cylindrical container in which subjects are placed, which is where Paschke and his team stepped in. "We had two sequences, one where the subject was a dead rat and another one where the subject was a human corpse," he explains. "Our brief was to create an event that kicks up in force and reaches a pinnacle. It should feel like a life or death situation – or rather a life or continued death situation."

After working out some concepts, Paschke moved onto researching electrical effects and video references online, trying to capture the right look and feel for the regeneration sequence.

"That was meant as a nod to the original *Frankenstein* and was also part of the brief," he details. "The practical set was open – it contained no glass and it was surrounded by a series of rings.

James McQuaide wanted the audience to believe that something quite eventful – and awful – was happening in those rings, some sort of force that moves from one ring to the next and meets in the middle. Significantly, it's meant to be a scientific event. This wasn't a Harry Potter moment – it wasn't magical. It was a science experiment and so the event couldn't appear so far-fetched as to seem magical. It had to feel as though its properties were believable."

To achieve the effect, Rising Sun utilised Houdini with a suite of bespoke effects. According to Paschke, three types of simulation effects were used. "There were arcs of electricity, which were based off curves," he says. "Then there were particle effects to show the plasma skinning. Then there were vapour effects to show that the machine was over cranking. All of that came out of Houdini."



> "This wasn't a Harry Potter moment – it wasn't magical… It had to feel as though its properties were believable"
> **Adam Paschke,** Visual effects supervisor

rsp [RISING SUN PICTURES]

Founded in 1995 in Adelaide, South Australia, Rising Sun Pictures has delivered a variety of world-class visual effects work alongside the best in the industry. With a recent portfolio that includes *The Hunger Games*, *Gravity* and *The Wolverine*, Rising Sun has established itself as one of the most capable and talented VFX houses today.

www.rsp.com.au

Project *I, Frankenstein*
Description Frankenstein's monster is recruited by mystical forces to protect Earth and its inhabitants from roaming demons. Now, after centuries fending off evil, Frankenstein's creature finds himself caught in an all-out, centuries old war between two immortal clans, and faces off against the demon-prince
Country USA
Client Lionsgate
Software used Houdini, NUKE, Maya

Contributors

Adam Paschke
Visual effects supervisor

Portfolio highlights

Here are some of the big budget movie projects Rising Sun Pictures has worked on:

2013 *Gravity*
2013 *The Wolverine*
2013 *The Great Gatsby*
2012 *Prometheus*
2012 *The Hunger Games*
2012 *Journey 2: Mysterious Island*
2011 *Green Lantern*
2011 *Pirates of the Caribbean: On Stranger Tides*
2010-11 *Harry Potter and the Deathly Hallows*

B

A Director Stuart Beattie is used to big VFX-heavy film productions. Before his work on *I, Frankenstein*, Beattie wrote the original *Pirates of the Caribbean*, though *I, Frankenstein* is only his second film as a director

B Other VFX companies that worked on *I, Frankenstein* include Luma Pictures, Cutting Edge, Proof and Prime Focus World . Rising Sun was in charge of creating effects for the stasis chamber scene

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G

C

D

E

F

Paschke was incredibly pleased with the Houdini's versatility when it came to the many other demands of the scene. "It was brilliant for relighting the set as well," he enthuses. "We comped everything in NUKE. We actually had direct cross-talk between Houdini and NUKE in order to do feedback loops. When necessary, we shared geometry from our Maya pipeline with both Houdini and NUKE. It was a closed loop and that's how we needed to keep it. We wanted to streamline the process so that we weren't sharing from ten bits of software."

It's almost as if Paschke and his team have put themselves in the role of the mad scientists. However, far from resulting in a monstrous creation, Paschke has been absolutely thrilled with the skills demonstrated by the team and what the studio has achieved with the sequence. "Controlled volatility is quite an art," Paschke concludes. "We were working with systems that responded like electricity and would arc along different parts of the environment. We got a system down pat that allowed us to control that quite effectively. So we were definitely satisfied with the result. It was good fun!"

C *I, Frankenstein* features a wide variety of creature designs and effects that bring the Gothic underworld of the movie to life, although it was down to other VFX houses to create the horrific characters

D Paschke refers to the electrical effects in the Rising Sun scene as "controlled volatility". Creating something that seems chaotic but is actually carefully choreographed can be a difficult task indeed

E "The scope of the effect grew as we became more excited about the details of the effects," reveals Paschke. "It got bigger and better and received a good response. We created something memorable"

F After the studio finished working on *I, Frankenstein*, it began work on a scene for the upcoming *X-Men: Days of Future Past*. "It's a cool sequence, but we can't say more at this time," Paschke teases

G Paschke on working with VFX supervisor James McQuaide: "He was the go-to person not only to review shots for visual quality, but also in terms of content. He knew the show and had so much inside information"

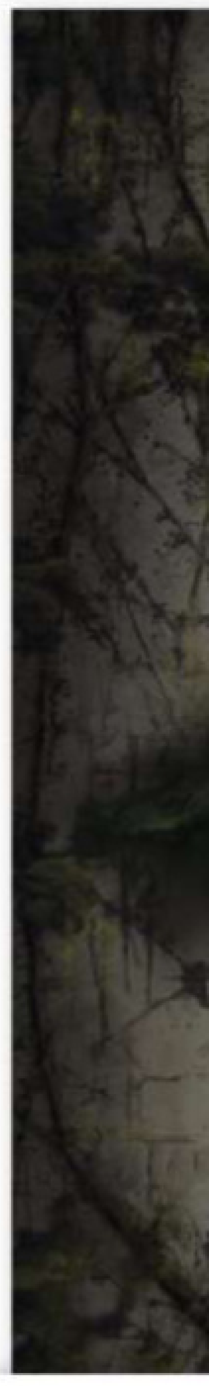
3dmagazine.com

Industry insider

Zach Bush

Freelance illustrator

Making the move from 2D illustration to 3D isn't easy, but Bush and his confident style make it appear just so



About the insider

Job Freelance illustrator
Location USA
Education BFA in Graphic Design, Radford University
Website www.zachbush.com
Biography Having grown up in a military family, Zach considers himself lucky to have moved around a lot and experienced many different parts of the world. Throughout his childhood he was homeschooled, played a lot of sports and was always drawing and sketching. He and his wife are expecting their first child, a boy, this spring

Despite having a strong career in 2D illustration, Zach Bush was determined to make the move into 3D, and as such taught himself CINEMA 4D and ZBrush. He might be relatively new to the industry, but his illustration style has always had an ambition and scope calling out for a bigger canvas, and now he's mastered the software there's sure to be no stopping him. He considers his Depthcore piece, *Replenish*, as his big 3D break, as it saw the commissions for 3D work start to roll in.

Although he studied graphic design at university, Zach's 3D skills are self-taught and honed, making him something of an inspiration to the many young artists so out there. However, "the worst thing is having to figure out how to do something on my own," he admits. "I can sometimes spend days, weeks or even months trying to figure out how to use a tool correctly. On the flip side, the best thing is when I actually do figure it out and see my idea go from conception to completion."

Now Zach is dreaming big. "Nothing gets me fired up quite like watching cinematic trailers for upcoming video games," he says. "I want to get to a point where I'm skilled enough to work within the game or film industry as a digital sculptor or a texture artist."

When did you first know that art was what you wanted to do professionally?
I've always been artistic. As child I was content to sit for hours drawing and in high school I was never without my sketchbook. However, it wasn't until college that I started seeing it as a career. I began with art studios and art education because I didn't know what else to do with my love of art. Then, the summer of my junior year, I was offered a graphic design job and it was there that I realised the potential of computer art. When I returned to school in the fall I switched my major to graphic design and everything took off from there.

When did you start using 3D software?
I learnt about CINEMA 4D in college but found it to be too intimidating, so it wasn't until around 2012 that I started seriously working on getting over the steep learning curve. It was around that time that I started experimenting with ZBrush as well.

What elements of 3D excite you most?
I've always been known for the realism and detail in my work, and 3D is one of the best avenues for achieving that, especially ZBrush. I also love that you can set up custom lighting and move the sculpt around for a different perspective instead of being bound to a single 2D image. I'd say I'm most proficient at texturing because of my advanced knowledge of Photoshop and the powerful Lightbox tool in ZBrush. As for my pipeline I start a sculpt in ZBrush, I use Lightbox to place textures on the sculpt, than I use GoZ to bring it into CINEMA 4D to set up the lighting, render it out and then add the final touches in Photoshop.

What advice would you give to a budding artist looking to follow a similar career path?
You have to have passion for doing this type of work because it'll be difficult. You may not understand how to use the programs in the way you want and you could start to compare how amazing someone else's work is to yours – someone who started at the same time as you – and you'll want to quit. If your frustration becomes greater than your passion then it will be easier to give up. What I found helpful was having friends in the 3D world that not only encouraged me, but challenged me to push my art further, rather than just settling for 'pretty good'. Follow the artists that inspire you too.

A

Portfolio highlights

Some recent features that Zach Bush has worked on:

2014 *Harper Collins*
2013 *Country Music Television*
2013 *BLT Communications*
2013 *Zelda*
2013 *Replenish*
2010 *Nvidia*
2009 *Genesis*
2009 *A Soul's Silhouette*
2009 *Survival vs. Intelligence*

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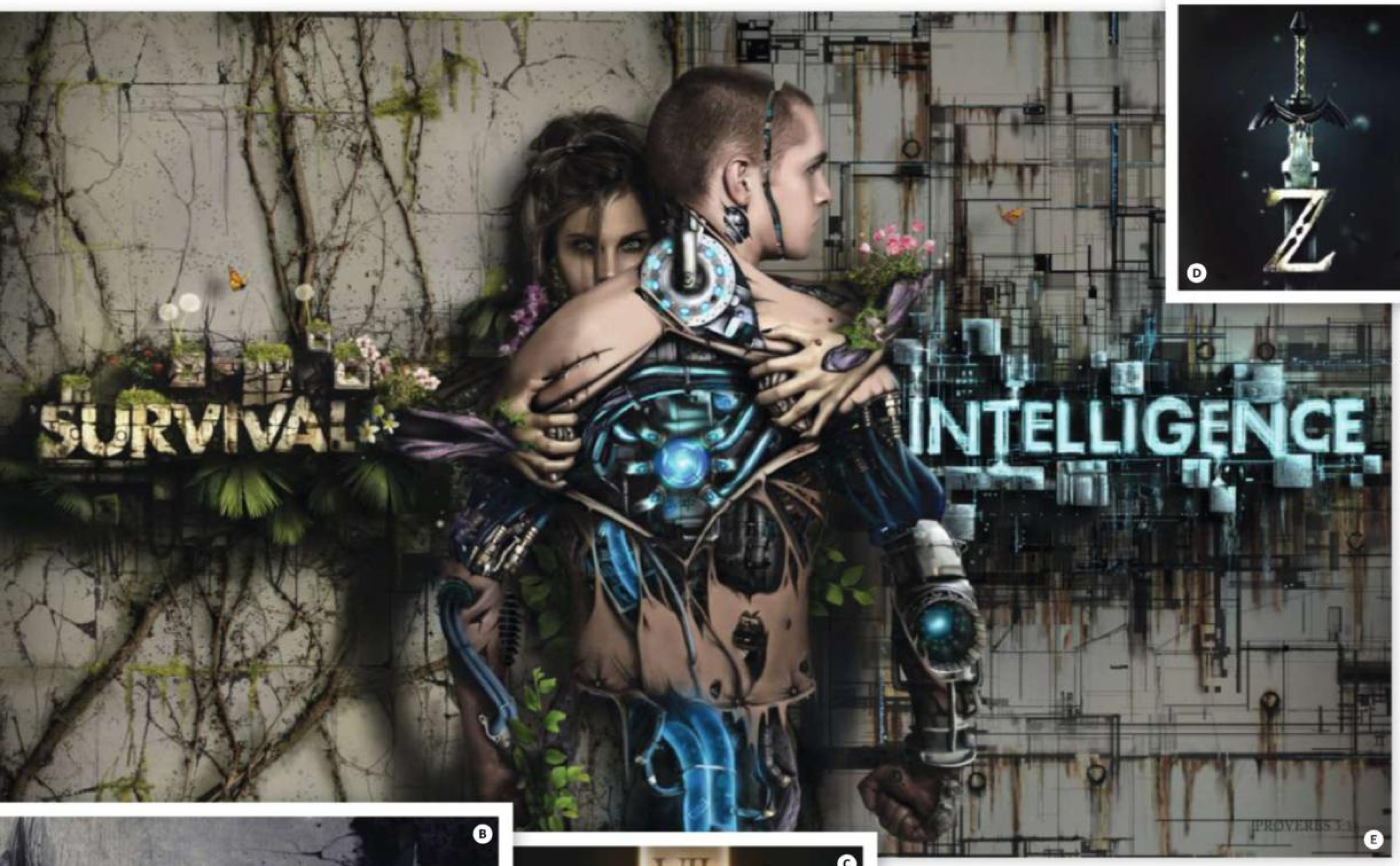

D

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B

C

E

Spending a day in the life of Zach Bush

One of the best things about being freelance is that no one day is like another, but it's paramount that you learn how to spend your time wisely

Right now, Zach says he is building 3D models of products for an oil company, as well as working on a character sculpt in ZBrush for a collaborative project with Wojciech Magierski (www.magierski.pl). His usual working day "starts with responding to clients and potential clients, working on my marketing and social media presence and balancing personal work with client work, while continuing to learn new things and get inspired."

> "I've always been known for the realism and detail in my work, and 3D is one of the best avenues for achieving that, especially ZBrush"

A Created in both CINEMA 4D and Photoshop, this lonely tin man was created and then brought to life for Slashthree's Fairy Tales online exhibition show

B This happens to be one of Zach's favourite images. Entitled *A Soul's Silhouette*. It demonstrates his more traditional 2D illustration style and skills

C Zach is eagerly awaiting the new *Star Wars* film, so he and his wife (as well as some lobsters that they had been eating) were the models for this image

D This image of a shining blade is based on the *Legend of Zelda* game series and is an interpretation if Link's famous sword. The work is aptly titled *Zelda*

E Zach says this image, titled *Survival vs. Intelligence*, is the one that made him fall in love with detail. He created it while he was still in college

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